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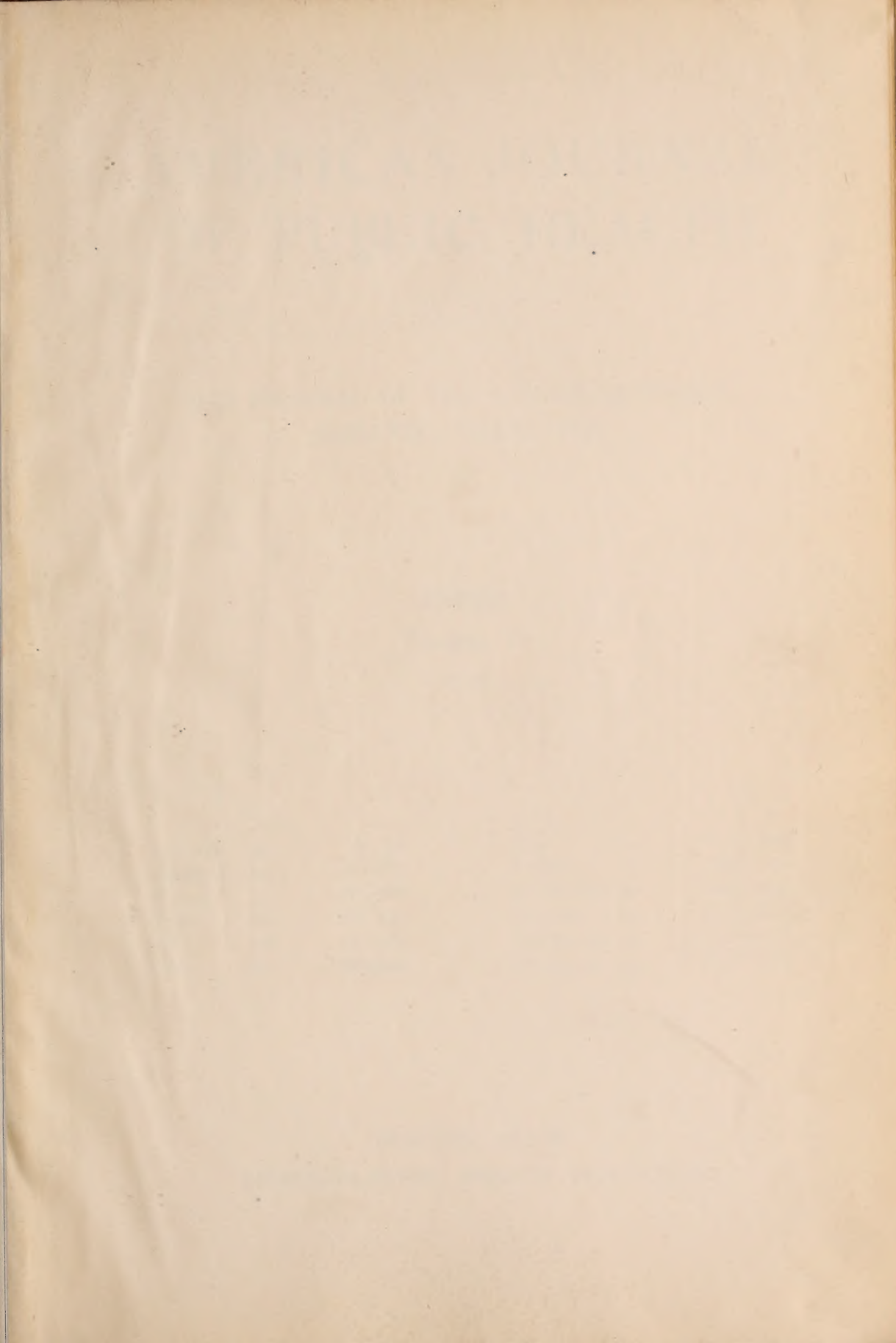



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AMERICAN JOURNAL OF PUBLIC HEALTH

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No. 1

A SURVEY OF THE ACTIVITIES OF MUNICIPAL HEALTH DEPARTMENTS IN THE UNITED STATES.

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THE purpose of this investigation was to obtain an approximate idea of the status of health department work in the United States; to examine the departments' programs and their financial resources, and to discover how great or small an advantage they were taking of their existing opportunities. Such an exposition of the condition of our local public health work should aid public health officials to secure increased appropriations and should serve as a basis for future measurements of public health progress.

In scope the investigation was limited to cities having a population of 25,000 and over according to the census of 1910, and to twelve phases of work chosen as of special importance and interest. The location of the cities, of which there were 227, is shown in Fig. 1; their distribution by state and group of states is given in Table 1.

The investigation was carried on entirely by mail. On August 1, 1913, letters were addressed to the health

officers of the cities, requesting copies of their last two annual reports, their codes, and their financial statements. These letters also enclosed a questionnaire covering the twelve subjects of inquiry; namely, appropriation (two questions), infant hygiene work, medical inspection of school children, laboratory service, health education and publicity, control of venereal diseases, housing regulation, dispensary service, tuberculosis work, industrial hygiene, and the number of privies. About one third of the departments answered this first letter; another third a second letter sent out three weeks after the first; and another fifth a third letter sent out a month after the second. Letters addressed to mayors and chambers of commerce brought in replies from 23 more cities, leaving only eight,* 3.5 per cent. of the total, unheard from at the close of the canvass. Further correspondence was necessary because a considerable number of the replies were incomplete in some particular, and in the end it was not

* Columbia, S. C.; Council Bluffs, Ia.; Holyoke, Mass.; Joplin, Mo.; Knoxville, Tenn.; Newport, Ky.; Springfield, Mo.; Waco, Tex.

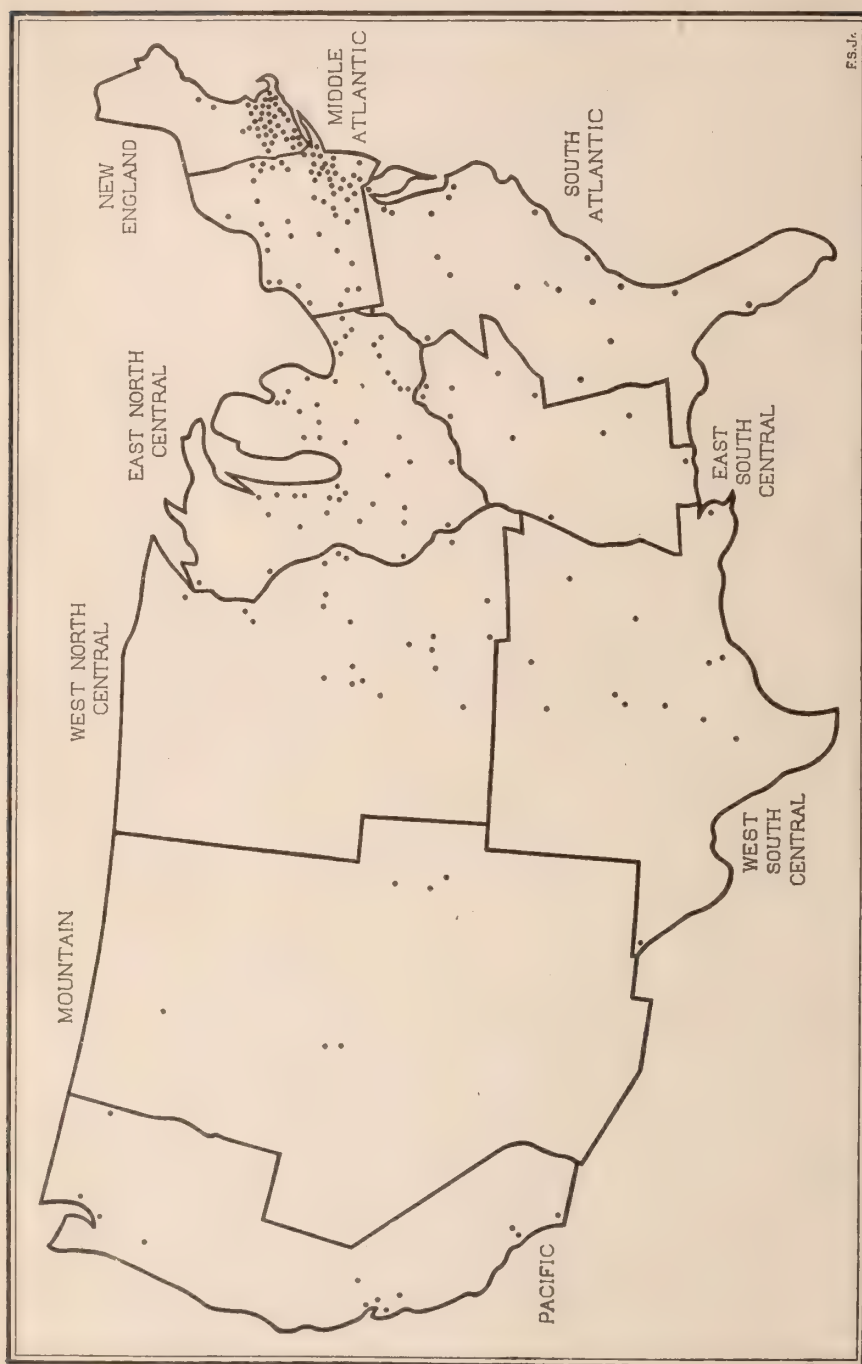


FIGURE 1. Location of Cities of 25,000 Population and Over According to the Census of 1910
Each dot represents a city; the heavy black lines the boundaries of the several state-groups.

possible to secure complete information on all points from all the 219 cities reporting. The smallest number of cities giving satisfactory information in answer to any one of the questions regarding the department's program was 201—in the case of the question regarding infant mortality.

The fiscal year for which information from the majority of the cities was secured is the calendar year of 1913; in a few cases it varied slightly from this period and in a few cases the appropriation figure for 1912 had to be accepted. Such cases were, however, relatively rare and occurred in such distribution as not to vitiate any of the conclusions presented in this paper. The populations used in all computations are those for July 1, 1913, as estimated by the Bureau of

TABLE 1.

NUMBER OF CITIES OF 25,000 POPULATION AND OVER IN 1910 BY STATES AND STATE-GROUPS.

New England States.....	40
Maine.....	2
New Hampshire.....	2
Massachusetts.....	25
Rhode Island.....	4
Connecticut.....	7
Middle Atlantic States.....	55
New York.....	21
New Jersey.....	14
Pennsylvania.....	20
South Atlantic States.....	20
Delaware.....	1
Maryland.....	1
District of Columbia.....	1
Virginia.....	5
West Virginia.....	2
North Carolina.....	2
South Carolina.....	2
Georgia.....	4
Florida.....	2

East North Central States.....	48
Michigan.....	9
Wisconsin.....	8
Ohio.....	14
Indiana.....	5
Illinois.....	12
West North Central States.....	22
Minnesota.....	3
Iowa.....	8
Nebraska.....	3
Missouri.....	5
Kansas.....	3
East South Central States.....	11
Kentucky.....	4
Tennessee.....	4
Alabama.....	3
West South Central States.....	13
Arkansas.....	1
Oklahoma.....	2
Louisiana.....	2
Texas.....	8
Mountain States.....	6
Montana.....	1
Colorado.....	3
Utah.....	2
Pacific States.....	12
Washington.....	3
Oregon.....	1
California.....	8
Total.....	227

the Census. While absolute accuracy cannot be claimed for the material contained in this paper, no effort has been spared to draw only conclusions for which the data is adequate, and it is confidently believed that the picture presented is a fair representation of conditions existing at the time of the investigation.

APPROPRIATION.

The first inquiry on the schedule related to the amount of the department's annual appropriation. This question was answered by 206 cities, representing a population of 29,488,

321; the aggregate total appropriation being \$13,155,547, giving a crude per capita figure of 44.6 cents. As this figure was sure to include many expenditures not common to all departments, and many of no special hygienic significance, a second question inquired what parts of the crude appropriation should be charged off for the following enterprises: hospitals and sanatoria; plumbing inspection; street cleaning;

location. This corrected figure, which is the one discussed in this paper except where specifically stated to the contrary, aggregated \$9,650,515, or 32.7 cents per capita. Excluding New York City, with its big appropriation of over three million dollars, the figure drops to 27.3 cents per capita. The facts regarding these appropriation figures for the grand divisions of states are shown in Table 2.

TABLE 2.
POPULATIONS AND HEALTH DEPARTMENT APPROPRIATIONS OF CITIES BY STATE-GROUPS.

Group of states.	Cities report- ing.	Aggregate population.	Appropriation.		
			Total amount.	"Corrected" amount.	Ratio of "corrected" to total.
New England.....	39	3,344,302	\$1,585,486	\$938,775	59.2%
Middle Atlantic.....	55	11,541,623	5,846,815	4,716,305	80.7%
South Atlantic.....	17	1,853,087	785,704	601,280	76.5%
East North Central.....	44	6,716,947	2,141,899	1,655,739	77.3%
West North Central.....	17	1,850,371	467,428	358,381	76.7%
East South Central.....	8	852,073	329,720	267,440	81.1%
West South Central.....	9	838,263	299,025	230,187	77.0%
Mountain.....	5	462,943	307,262	164,203	53.4%
Pacific.....	12	2,028,712	1,392,208	718,205	51.6%
Total.....	206	29,488,321	\$13,155,547	\$9,650,515	73.4%

the removal or disposal of dead animals, refuse, garbage, or night soil; and any other unusual undertakings. Deducting these items, the remaining expenditure should represent with considerable accuracy the amount devoted to actual preventive measures, and should offer a fair basis for comparison between cities of different size and

The general tendency of the per capita appropriation to vary directly with the size of the city is shown in Table 3, which gives both the aggregate per capita—obtained by dividing the aggregate appropriation by the aggregate population, and the average of the per capita figures of the individual cities.

TABLE 3.

HEALTH DEPARTMENT APPROPRIATIONS* PER CAPITA IN CITIES BY SIZE-GROUPS.

Cities having population of	Cities reporting.	Aggregate population.	Aggregate appropriation.	Aggregate per capita.	Average per capita.	Average population.
300,000 and over.....	17	16,087,038	\$6,486,979	40.3c.	34.0c.	946,296
300,000 and over excluding New York city.....	16	10,888,150	3,477,033	31.9c.	32.6c.	680,509
100,000 to 300,000.....	38	6,045,943	1,688,959	27.9c.	26.7c.	159,104
50,000 to 100,000.....	55	3,890,259	790,014	20.3c.	19.6c.	70,732
25,000 to 50,000.....	96	3,465,081	684,563	19.8c.	19.3c.	36,095
All cities.....	206	29,488,321	\$9,650,515	32.7c.	21.9c.	143,147
All cities excluding New York city.....	205	24,289,433	\$6,640,569	27.3c.	21.8c.	118,485

The largest corrected figure was that of Seattle, \$.98; the smallest that of Clinton, Iowa, three fourths of one cent. Others of the larger expenditures were Memphis, Tenn., \$.93, Pittsburgh, Pa., \$.61, Augusta, Ga., \$.61, and New York City, \$.58; among the smaller were Easton, Pa., \$.02, Aurora, Ill., and South Bend, Ind., \$.03; Woonsocket, R. I., \$.04, and Lewiston, Me., \$.06. Such ridiculously small appropriations are by no means rare, and are to be found in almost any part of the country. The variation in liberality of the different sections of the country is brought out in Table 4, which shows the average per capita figure for the cities in the principal groups of states.

It is evident that marked variations occur, and that these are out of all proportion to differences in size of the cities in the several groups of states.

* "Corrected" appropriation.

Relatively the largest appropriations are in the Southeastern states; the

TABLE 4.

HEALTH DEPARTMENT APPROPRIATIONS† PER CAPITA IN CITIES BY STATE-GROUPS.

Group of states.	Cities reporting.	Average population.	Average per capita.
New England . . .	39	85,751	24.0c.
Middle Atlantic . . .	55	209,848	19.0c.
South Atlantic.....	17	109,005	34.4c.
East North Central	44	152,658	15.2c.
West North Central.....	17	108,845	15.4c.
East South Central	8	106,509	32.2c.
West South Central.....	9	93,140	28.7c.
Mountain.....	5	92,589	29.8c.
Pacific.....	12	169,059	29.7c.
Total.....	206	143,147	21.9c.

† "Corrected" appropriation.

smallest in the North Central. That these differences are of real significance with regard to the strength of the health departments in different parts of the country will become clearer in the light of the results of the other parts of the present investigation.

INFANT MORTALITY.

The third question on the schedule related to the department's efforts against infant mortality. Of 201 cities furnishing definite replies, 137, or 68.2 per cent. attempted milk inspection; 89 of these also employed nurses or maintained baby welfare stations; while 17 relied solely on private agencies. Forty-four per cent. of the cities, in other words, possessed the essential features of a program for the prevention of the avoidable deaths of the newborn and very young; 8.5 per cent. relied for such work solely on private agencies; while in 45 cities, or 22 per cent. of the whole, no effort whatever was made, not even milk inspection.

The variations in the amount of interest shown in the saving of infant life by cities of different size are brought out in Table 5. It is plainly evident that the smaller cities are very neglectful in this regard; whereas 94 per cent. of the cities over 300,000 population had what may be called a complete program—milk inspection, and nurses and infant welfare stations to follow up births and educate mothers, only 26 per cent. of the cities between 25,000 and 50,000 had initiated such work. Similarly not one of the first-named group of cities failed to do something; while 33 per cent. of the smaller ones did nothing whatever.

Table 6 brings out the differences in the activity with respect to this kind of work of health departments in different parts of the country. Here again it is interesting to note that the poorest showings are made by the North Central states, with New England and the South Central and Pacific states in the leading positions.

TABLE 5.
INFANT HYGIENE WORK IN CITIES BY SIZE-GROUPS.

Cities having population of	Cities reporting.	Having "complete" program.		Making no effort.	
		Number.	Per cent.	Number.	Per cent.
300,000 and over.....	18	17	94.4	0	0.0
100,000 to 300,000.....	39	27	69.2	3	7.7
50,000 to 100,000.....	50	21	42.0	11	22.0
25,000 to 50,000.....	94	24	25.5	31	33.0
All cities.....	201	89	44.3	45	22.4

TABLE 6.
INFANT HYGIENE WORK IN CITIES BY STATE-GROUPS.

Group of states.	Cities reporting.	Average population.	Having "complete" program.	
			Number.	Per cent.
New England.....	35	89,283	21	60.0
Middle Atlantic.....	53	215,615	21	39.6
South Atlantic.....	17	112,298	7	41.2
East North Central.....	46	147,205	16	34.8
West North Central.....	18	121,325	7	38.9
East South Central.....	7	113,482	4	57.1
West South Central.....	11	91,237	6	54.5
Mountain.....	5	92,589	2	40.0
Pacific.....	9	203,442	5	55.6
Total.....	201	146,809	89	44.3

MEDICAL INSPECTION OF SCHOOL CHILDREN.

The fourth question, on medical inspection of school children, was in most cases easily and clearly answered. Of 211 cities reporting, 167, or 79 per cent., reported some such inspection; the work being in 103 instances under the school authorities as against 56 for the health department. Five cities reported the inspection in public schools under the school authorities with that in parochial or private schools under the health department, while three reported joint control by the two authorities.

Again the big cities lead, as is shown in Table 7, although in this case the showing of the smaller cities is better than in the case of infant hygiene work. All of the larger cities had inspection systems, while even 71 per cent. of the group of smallest cities provided the service. The examination of school

children is evidently one of the features of a public health program whose importance has something like general recognition.

It is interesting to note that the provision for inspection is most complete in the New England and Middle Atlantic states, with the Pacific and South Central states following. The

TABLE 7.
MEDICAL INSPECTION OF SCHOOL CHILDREN IN CITIES BY SIZE-GROUPS.

Cities having population of	Cities reporting.	Having inspection.	
		Number.	Per cent.
300,000 and over..	18	18	100.0
100,000 to 300,000..	39	37	94.9
50,000 to 100,000..	52	40	76.9
25,000 to 50,000..	102	72	70.6
All cities.....	211	167	79.1

TABLE 8.

MEDICAL INSPECTION OF SCHOOL CHILDREN IN CITIES BY STATE-GROUPS.

Group of states.	Cities reporting.	Average population.	Having inspection.	
			Number.	Per cent.
New England.....	37	87,129	37	100.0
Middle Atlantic.....	53	215,097	49	92.5
South Atlantic.....	19	104,780	12	63.2
East North Central.....	47	144,739	29	61.7
West North Central.....	19	129,357	12	63.2
East South Central.....	9	98,890	8	88.9
West South Central.....	10	87,361	8	80.0
Mountain.....	5	92,589	1	20.0
Pacific.....	12	169,059	11	91.7
Total.....	211	142,799	167	79.1

Mountain group is markedly the poorest off, while the showing of the North Central states is again relatively inferior.

LABORATORY SERVICE.

The fifth question related to the department's laboratory facilities. The commoner laboratory diagnoses—for diphtheria, tuberculosis, and ty-

phoid, were offered in 136, or 62 per cent. of the 218 cities reporting. Of the other diseases, gonorrhea was fairly often included, but syphilis less frequently. The replies regarding the examination of water, milk, and foods, showed that nearly three fourths of the departments had facilities for chemical and bacteriological determinations.

Once again the larger cities make the

TABLE 9.

HEALTH DEPARTMENT LABORATORY SERVICE IN CITIES BY SIZE-GROUPS.

Cities having population of	Cities reporting.	Having diagnostic service.		Having bacteriological service.		Having chemical service.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
300,000 and over.....	18	18	100.0	18	100.0	18	100.0
100,000 to 300,000.....	40	33	82.5	33	82.5	36	90.0
50,000 to 100,000.....	57	34	59.6	42	73.7	39	68.4
25,000 to 50,000.....	103	51	49.5	62	60.2	63	61.2
All cities.....	218	136	62.4	155	71.1	156	71.6

better showings, as may be seen from Table 9. In the group of largest cities all have well-rounded laboratories. Among the smaller cities it is interesting to note that their weakness is more pronounced with regard to facilities for laboratory diagnosis of communicable diseases than those for chemical and bacteriological examination of milk, water, and food, a circumstance

PUBLICITY AND EDUCATION.

Passing to efforts at health education and publicity, over one fourth of 214 departments reported no effort whatever. The favorite medium for such endeavors when made was the newspaper, utilized to some degree or other in 88 instances. Fifty-three, or one fourth, of the departments issued regular bulletins; 56 attempted

TABLE 10.

HEALTH DEPARTMENT LABORATORY SERVICE IN CITIES BY STATE-GROUPS.

Group of states.	Cities report- ing.	Average popu- lation.	Having diagnostic service.		Having bacterio- logical service.		Having chemical service.	
			Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
New England.....	39	85,751	24	61.5	28	71.8	27	69.2
Middle Atlantic.....	55	209,848	31	56.4	33	60.0	32	58.2
South Atlantic.....	19	104,780	16	84.2	16	84.2	15	78.9
East North Central...	48	143,020	26	54.2	34	70.8	35	72.9
West North Central...	19	129,357	10	52.6	13	68.4	14	73.7
East South Central...	9	98,890	8	88.9	9	100.0	9	100.0
West South Central...	12	89,226	8	66.7	9	75.0	9	75.0
Mountain.....	5	92,589	2	40.0	2	40.0	4	80.0
Pacific.....	12	169,059	11	91.7	11	91.7	11	91.7
Total.....	218	140,605	136	62.4	155	71.1	156	71.6

which must be regarded as unfortunate.

Table 10 shows the varying strength of health department laboratory service in the different parts of the country. The South Eastern and Pacific states again make superior showings, while the Middle Atlantic, North Central, and Mountain states show perhaps the greatest opportunities for improvement.

lectures; while 51 distributed pamphlets or circulars. Table 11, giving the number and proportion of departments having, on the one hand, regular bulletins and, on the other, doing nothing at all, gives an idea of the variation in value of efforts in this line by cities of different size.

The story told is again the same; the larger cities have a higher percentage of regular bulletins and a lower per-

TABLE 11.

TWO TESTS OF HEALTH DEPARTMENT EFFORTS AT HEALTH EDUCATION
AND PUBLICITY IN CITIES BY SIZE-GROUPS.

Cities having population of	Cities reporting.	Having regular bulletins.		Making no effort.	
		Number.	Per cent.	Number.	Per cent.
300,000 and over.....	18	13	72.2	0	0.0
100,000 to 300,000.....	40	13	32.5	9	22.5
50,000 to 100,000.....	54	9	16.7	13	24.1
25,000 to 50,000.....	102	18	17.6	37	36.3
All cities.....	214	53	24.8	59	27.6

centage of departments making no effort. The indication with regard to the regular bulletin corresponds in a general way to those for other forms of publicity and education; cities having bulletins are more likely to carry on the other activities.

The Pacific states lead in the two tests applied in Table 12, followed by

the East South Central states. The Mountain states and New England are much in the rear; while the North Central states this time hold an intermediate position. Considerable progress probably has been made in health department educational effort since the time this investigation was initiated, as this field is one of the

TABLE 12.

TWO TESTS OF HEALTH DEPARTMENT EFFORTS AT HEALTH EDUCATION
AND PUBLICITY IN CITIES BY STATE-GROUPS.

Group of states.	Cities report- ing.	Average popula- tion.	Having regular bulletins.		Making no effort.	
			Number.	Per cent.	Number.	Per cent.
New England.....	38	86,907	7	18.4	16	42.1
Middle Atlantic.....	54	212,784	11	20.4	17	31.5
South Atlantic.....	18	106,853	5	27.8	6	33.3
East North Central.....	48	143,020	10	20.8	9	18.8
West North Central.....	19	129,357	6	31.6	4	21.1
East South Central.....	9	98,890	3	33.3	1	11.1
West South Central.....	11	89,181	3	27.3	1	9.1
Mountain.....	5	92,589	1	20.0	4	80.0
Pacific.....	12	169,059	7	58.3	1	8.3
Total.....	214	142,063	53	24.8	59	27.6

more rapidly developing ones of health work; but certainly the opportunity for improvement existed throughout the country and on a large scale.

VENEREAL DISEASES

Some interesting replies were received to the question as to what steps the department had taken toward control of the venereal diseases. Twenty-eight cities reported some effort more aggressive than free laboratory diagnosis. In fourteen cities the problem was attacked along the line of case reporting; seven requiring reports, five requesting them, two requiring them from institutions, and one making free laboratory diagnosis conditional on report of the case. Another line of attack was represented by the free laboratory diagnosis of gonorrhea and syphilis—the former being offered in 82 cities, the latter in 46. Four cities offered free dispensary treatment; three forced dangerous cases into hospitals; and two offered hospital care to indigents. Regular inspections of prostitutes were made in eight cities, this type of effort in most instances being commented on as unsatisfactory in results. Publicity and education, reported by three cities; placarding of houses of prostitution when considered necessary, reported by one city; and prohibition of employment of persons having venereal disease in food-handling places, also reported by one city; completes a list of measures attempted which probably indicates certain of the ways in which health departments will endeavor to combat these highly important diseases in the future.

DISPENSARIES AND OUTDOOR RELIEF.

The replies to the question relating to the existence of city dispensaries and outdoor relief are worth analysis because of the opportunities possession of such service offers the health department in the way of locating and controlling otherwise undiscovered sources of infectious disease. Sixty-six of 211 cities reported a free dispensary service; administration being in charge of the health department in 22 instances, the charity department in 18, city hospital in 10, a private organization receiving a city subsidy in seven, the county in six, and the police department in three instances. Fourteen cities reported district physicians working under the direction of the health department.

TABLE 13.

REPORTS OF FREE DISPENSARY SERVICE IN CITIES BY SIZE-GROUPS.

Cities having population of	Cities reporting.	Having service.	
		Number.	Per cent.
300,000 and over .	18	11	61.1
100,000 to 300,000	38	19	50.0
50,000 to 100,000.	54	13	24.1
25,000 to 50,000.	101	23	22.8
All cities	211	66	31.3

Table 13 makes it clear that the larger cities reported a markedly higher proportion of free dispensaries; while Table 14 shows the relative frequency of this service in different parts of the country. The Southern states again make the best showings;

TABLE 14.

REPORTS OF FREE DISPENSARY SERVICE IN CITIES BY STATE-GROUPS.

Group of states.	Cities reporting.	Average population.	Having service.	
			Number.	Per cent.
New England.....	39	85,751	14	35.9
Middle Atlantic.....	53	215,611	16	30.2
South Atlantic.....	19	104,780	8	42.1
East North Central.....	47	145,066	11	23.4
West North Central.....	18	121,325	4	22.2
East South Central.....	9	98,890	4	44.4
West South Central.....	9	93,542	5	55.6
Mountain.....	5	92,589	1	20.0
Pacific.....	12	169,059	3	25.0
Total.....	211	142,123	66	31.3

the North Central and Mountain states the poorest.

TUBERCULOSIS.

Surely in these days one would expect the doctrine of tuberculosis prevention to be widely spread, yet only 23.9 per cent. of the cities reported a comprehensive program; 6.2

per cent. fell a little short of such a program; 14.4 per cent. reported no attempt whatever; while 55.5 per cent.* were satisfied with mere fragments of a program. The phrase "comprehensive program" is used here to include compulsory reporting of cases, free laboratory diagnosis, investigation and visitation of reported

TABLE 15.

HEALTH DEPARTMENT TUBERCULOSIS PROGRAMS IN CITIES BY SIZE-GROUPS.

Cities having population of	Cities reporting.	Having "comprehensive" program.		No case investigation.		No activity whatever.	
		Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
300,000 and over.....	18	14	77.8	2	11.1	0	0.0
100,000 to 300,000.....	37	16	43.2	18	48.6	4	10.8
50,000 to 100,000.....	56	8	14.3	37	66.1	8	14.3
25,000 to 50,000.....	98	12	12.2	75	76.5	18	18.4
All cities.....	209	50	23.9	132	63.2	30	14.4

* Includes 6.7 per cent. on account of Pennsylvania cities reporting state dispensary system.

cases by nurses or medical inspectors, free sanatorium facilities for those who need them, and disinfection after the termination or removal of a case.

The variation in amount and value of anti-tuberculosis work in cities of different size is very striking, as may be seen from Table 15. Whereas 78 per cent. of the cities over 300,000 population had comprehensive programs, only 12 per cent. of the cities between 25,000 and 50,000 enter this class. Similarly, only 11 per cent. of the larger cities fail to investigate the reported cases, as compared with 77 per cent. for the smaller cities. Finally, none of the larger cities ignores

showings of all, none of these reporting a comprehensive program and none investigation of reported cases. These regions also furnish the highest proportions of cities absolutely ignoring the problem. The showings of the eastern cities are manifestly the better, and probably reflect the extent and energy of the anti-tuberculosis campaigns carried on by private organizations in these districts.

OTHER HYGIENIC CONSIDERATIONS.

Another branch of public hygiene receiving little attention in these cities is that relating to industry. Out of 217 cities, only 11, or 5.1 per cent.,

TABLE 16.

HEALTH DEPARTMENT TUBERCULOSIS PROGRAMS IN CITIES BY STATE-GROUPS.

Group of states.	Cities reporting.	Average population.	Having "comprehensive" program.		No case investigation.		No activity whatever.	
			Number.	Per cent.	Number.	Per cent.	Number.	Per cent.
New England.....	38	87,268	14	36.8	22	57.9	5	13.2
Middle Atlantic.....	53	215,610	13	24.5	21	39.6	3	5.7
South Atlantic.....	18	108,574	5	27.8	12	66.7	4	22.2
East North Central.	48	143,020	11	22.9	36	75.0	8	16.7
West North Central.	17	126,155	2	11.8	13	76.5	4	23.5
East South Central..	8	91,451	3	37.5	5	62.5	1	12.5
West South Central.	10	93,159	0	00.0	10	100.0	3	30.0
Mountain.....	5	92,589	0	00.0	5	100.0	2	40.0
Pacific.....	12	169,059	2	16.7	8	66.7	0	00.0
Total.....	209	142,883	50	23.9	132	63.2	30	14.4

the problem entirely as compared with nearly a fifth of the smaller cities which made no effort whatever.

In the regional analysis, given in Table 16, the West South Central and Mountain cities make the poorest

reported any effort. Four of these reported inspection systems; others reported lectures and bulletins, and coöperative efforts with labor unions. The larger cities reported a higher proportion of endeavor, the proportion

ranging from 27.8 per cent. for the cities of 300,000 population and over down to 1 per cent. for cities of 25,000 to 50,000. The number of cities answering this question in the affirmative was too small to make their regional distribution of any significance. In considering the slight interest shown by our cities in industrial hygiene it must be remembered that this work is often, and properly, delegated to the state industrial authorities; still it cannot be denied that with the present development of state effort there is ample opportunity for useful activity on the part of local health authorities.

Another subject on which information was solicited was the existence of a "housing" code as distinguished from a "building" code. Of 209 cities, 153 answered this question in the negative. The proportion of cities reported as having no regulations ranged from 22.2 per cent. for cities over 300,000 population up to 86.1 per cent. for cities between 25,000 and 50,000. The Pacific cities reported the highest proportion of regulations; the Mountain cities the lowest.

The approximate number of dry closets and privy vaults, although not a direct test of the status of the health department's program, was considered of enough importance to justify the insertion of an inquiry on the questionnaire. Of the total of 219 departments heard from during the entire investigation, 25.6 per cent. were unable to give even an approximate answer to this question. The aggregate population of the 163 cities that did furnish estimates was 25,595,-

415, the aggregate number of privies being 479,947, giving a ratio of 18.8 privies per 1,000 population. The average of the privies per 1,000 population ratios of all these cities was somewhat higher—33.8. In connection with these estimates the writer would draw attention to the fact that in his experience such estimates by local authorities of the number of wells and privies in their city err greatly on the side of understatement. From the figures in hand it is probably in no wise extravagant to estimate a total of a million privies in our cities.

TABLE 17.

PRIVIES AS ESTIMATED BY THE HEALTH AUTHORITIES IN CITIES BY SIZE-GROUPS.

Cities having population of	Cities reporting.	Number of privies.	Average of per 1,000 population.
300,000 and over.	15	146,904	15.3
100,000 to 300,000	31	139,416	31.3
50,000 to 100,000.	43	90,889	31.1
25,000 to 50,000.	74	102,738	40.2
All cities.	163	479,947	33.8

A glance at Table 17 makes it appear that the small cities are again relatively the worst. The large number of privies in the larger cities, however, shows that the country's privy problem is not restricted to the smaller cities.

In the regional analysis New England appears far and away ahead, with the Pacific and Middle Atlantic states

TABLE 18.

PRIVIES AS ESTIMATED BY HEALTH AUTHORITIES IN CITIES BY STATE-GROUPS.

Group of states.	Cities reporting.	Average population.	Number of privies.	Average of per 1,000 population.
New England.....	29	73,522	8,566	5.9
Middle Atlantic.....	42	252,638	114,812	24.7
South Atlantic.....	16	115,297	47,385	51.1
East North Central.....	36	175,975	142,100	48.3
West North Central.....	15	137,134	64,390	30.4
East South Central.....	8	97,023	43,094	77.4
West South Central.....	6	60,071	21,500	55.9
Mountain.....	3	124,063	19,000	63.0
Pacific.....	8	138,345	19,100	18.5
Total.....	163	157,027	479,947	33.8

following. The Southern and Mountain cities have relatively the greatest number of privies, with the North Central states in an intermediate position.

SUMMARY AND CONCLUSIONS.

What now are the conclusions to be drawn from these figures? We have seen that at the time of this investigation a fifth of the cities made no inspection of school children; over a third did not offer the ordinary laboratory diagnosis for the commoner communicable diseases; over a fourth made no effort to educate in health matters; nearly three fourths had no housing law; nineteen twentieths had no concern with the hygiene of industry; over six sevenths had no program against the venereal diseases; over a half had no proper organization to combat infant mortality; and less than a quarter had a coherent program against tuberculosis. Surely these facts argue for a surprising amount of neglected oppor-

tunity. And when we consider that this investigation made no effort to determine the efficiency of the work attempted, but only whether or not it was attempted; and when, with the departments with which we are familiar in mind, we reflect on the partial thoroughness with which their slender staffs compel them to perform their work, the conclusion becomes inevitable that public health work in this country is still in its infancy—certainly as far as application of established scientific methods is concerned.

The striking correlation between the size of the city and the activity of the health department is another important result. Fig. 2, which presents graphically the rankings with regard to the several subjects of investigation of the groups of different sized cities, shows that in every case the larger cities made the better showings, receiving relatively more money from the public treasury and carrying on

Cities having Pop- ulation of	Appro- priation	Infant Mortal- ity	Inspection of School Children	Laboratory Service			Educa- tion and Public- ity	Dispen- sary Service	Tuber- culosis
				Diag- nostic	Bacte- riolog- ical	Chem- ical			
300,000 and over									
100,000 to 300,000									
50,000 to 100,000									
25,000 to 50,000									

FIGURE 2. Ranking With Regard to Nine Tests of Health Department Activity of Cities by Size-Groups. The darker shadings indicate inferior rankings.

larger and more intensive programs. It might be argued that this fact does not mean a better meeting of the public health problem by the larger cities—that conditions in the larger cities are so much worse that they are compelled to carry on more extensive health department work in order to keep

disease down to the level existing naturally in the smaller cities. Such an argument is, however, based entirely on assumption, and is in contradiction to such facts as that the rural death-rate of New York state is now in excess of that of New York city, although the reverse was formerly the case. It

Group of States	Appro- priation	Infant Mortal- ity	Inspection of School Children	Laboratory Service			Educa- tion and Public- ity	Dispen- sary Service	Tuber- culosis
				Diag- nostic	Bacte- riolog- ical	Chem- ical			
East South Central									
Pacific.....									
South Atlantic									
West South Central.									
New England.....									
Middle Atlantic.....									
East North Central.									
West North Central.									
Mountain.....									

FIGURE 3. Ranking With Regard to Nine Tests of Health Department Activity of Cities by State-Groups. White indicates that the group ranks among the highest three; cross-hatching that it ranks among the second three; black that it ranks among the lowest three. The groups are listed in the order of the sums of their rankings with regard to the nine tests.

seems to the writer that the direct indication is the more probable explanation of the facts; that is, that the inhabitants of the larger cities are receiving better protection from preventable disease.

Another striking result of the investigation is the variation in activity exhibited by health departments in different sections of the country. This is brought out graphically in Fig. 3, which shows the standing of each group of states with regard to each of the points of investigation. The Southern and Pacific cities clearly outrank the others; while the North Central and Mountain cities are markedly inferior. This result is perhaps less surprising than might at first appear if we will reflect on the fact that a good proportion of our very best health officers are located in the South. It is also certainly a fact that many of our northern departments, especially in the smaller places, are relics of other days, being in many instances mere nuisance abatement offices.

One other point should receive all possible emphasis—the relation between these examples of municipal neglect and the scanty health department appropriations. What can we expect of a department in a city of 25,000 whose total appropriation is but \$200? And if the New York city department uses 58 cents per inhabitant per year and has to practice great care to make it go round, what can

our average city do on only 22 cents? Again, do any real differences in local conditions require that Seattle spend 98 cents per inhabitant per year while Woonsocket may rest content with four cents?

The answer is, of course, evident; our health departments now have new functions to perform which the public and, it is to be feared, many of the departments themselves do not appreciate. Far too many of our city health departments undertake far too little in proportion to their opportunities; on the other hand, all too few receive an anywhere near adequate appropriation. Under the circumstances one may reemphasize the suggestion that there should be a minimum yearly per capita figure for a modern department—a kind of minimum wage. The suggestion is not new—having been made by Park in 1911, the figure set by him ranging from 50 cents to \$1.00 according to the size of the city, and by the Committee on Activities of Municipal Health Departments of the American Public Health Association, its figure being 50 cents. Certainly 50 cents for real preventive measures would be an entirely reasonable figure, and in all probability the time is not far distant when our cities will allow their health departments a dollar a head—an amount still moderate when compared with that spent for police or fire protection, and will realize a handsome profit on the investment.

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THE WASTERS OF THE WORLD.

HON. WILLIAM C. REDFIELD,
Secretary of Commerce.

An Address before the American Public Health Association, Rochester, N. Y., September 8, 1915.

IF YOU will go into the old town of New Castle, Del., and into St. James Church, at the upper end of the middle hall you will find a stone in the floor in memory of a former pastor. It reads, "Born in such-and-such a town in England, 1710; died in New Castle, 1831." I assume that he is a fine and fair object lesson for the great work that you have in hand, and certainly his long and useful life gives hope and encouragement as to what the high success of your efforts may be in bringing longevity, which, as you have heard, means human happiness. As I think of him I am reminded, too, of a relative of mine still going every day to his work at over 90 years of age, to whom I said a few months since that he should step into the House of Representatives to see its new furniture. He replied, "I suppose I ought. The last time I was there Mr. Calhoun was speaking."

On Sunday afternoon last I stood and studied a cornfield. It was a most unusual cornfield, and beside it stood the thing out of which it had been made. About a mile south of the city of Washington, on the road to Alexandria, was a noisome swamp, full of all things ugly. About a year ago it became necessary to deepen the waters of the Potomac that coal barges might reach the entrance to the canal which discharges at Georgetown. In the process they transferred the

bottom of the Potomac River into the swamp and filled it up, about a hundred acres of it, until it became good and useful land; and the swamp that a year ago was an annoyance and a pest is now a productive field of corn, and side by side with it, merely the width of a narrow road way, lies still a portion of the ancient swamp.

As I looked at it Sunday afternoon it seemed to me an object lesson in the prevention of waste, for in how many ways did it add to human happiness! The workman and the merchant were the better for the work from which the filling of the swamp arose. The swamp itself, a menace and a discomfort, was gone, and there had been substituted for it a productive field where human labor was earning and where human food was growing. That whole process was redemptive and creative, an admirable though a simple example of what the prevention of waste may mean and of its manifold effect upon human happiness and life.

I want briefly to place before you this evening against the background of the war the condition of our own land, and then to look a little below the surface as to certain great wastes which we still permit and about which, while we trouble much concerning lesser things, we refuse to get excited or even interested.

I have chosen as my subject "The Wasters of the World" in part because

we all have in the background of our thought the sad losses which civilized mankind are suffering from the present war, in part because it is the high purpose of your body to stop the needless loss of human life and health from preventable causes, and also in part because there are lessons we as a nation greatly need to learn from a brief discussion of the theme.

Doubtless we all naturally think of the warring nations as the world's chief wasters of the time. It may be we shall find reason to question so hasty a conclusion; but certainly the most easily visible form of the world's great wastes appears in the current war. Our thought is naturally fixed upon the immediate losses which we see or of which we hear, but a little reflection will show that many of these losses are not only present but future, that they project themselves down the years and that complete recovery from them cannot be rapid.

There has been some talk among the unthinking and fearful which, taken at its face, would seem to mean that the nations will spring anew as with a bound into their former places of prestige and power with the signing of a treaty of peace, and that those of us who have in the past felt the keen pressure of their rivalry may expect to find that rivalry renewed with at least equal vigor promptly on the closing of the war. Analysis will not confirm this view, nor will example favor it. Let us look for an illustration in our own history at our honored sister Commonwealth of Virginia. She gave with rare devotion her sons and her treasure fifty years ago to a cause in

which her heart and conscience were enlisted. She became, through the course of unhappy events and through no fault of her own, the battleground in a particular sense of the great contest between brethren. She bore her noble part and suffered both nobly and sadly and has, let us be thankful, taken again a prominent and an honorable place among our sisterhood. But let us think a moment of what she suffered for the cause to which she willingly gave her best and of the patient, slow progress of recovery through which she has so bravely passed. Consider whether her economic conditions could have been such soon after the close of the war between the states that she could in any sense have become a rival or dangerous competitor in a peaceful commercial contest with any of the other states associated with her in our common Republic. Her sons were slain, her funds were lost, her lands were ravaged, her agriculture and industry sadly injured if not destroyed. It was inevitable that time and patient work projected through years should be taken for the recovery of which we all are now glad. The same is true in a different degree of the whole Southland, and the North itself long felt (though its lands were untouched) the pressure and strain of the contest. Out of it has grown indeed a wonderful prosperity, but it did not jump into being; it took time.

It is not meant to apply this as a precise parallel to conditions abroad, though to a greater or less extent and with different relations in different places the example is not seriously incorrect. Certain it is that the great

industrial powers are using their credit to the full and in large part wasting it in war; are accumulating burdens of debt from which they would have shrunk had any less serious emergency faced them; are laying upon the future a legacy of heavy taxation while at the same time consuming the wealth from the earning power of which alone those taxes can be paid.

On the field of battle the shrapnel and the shell slay manager and laborer, the leading and the led, trained brain and skilled hand, impartially. It is not the military caste alone that is killed; it is the working man and the employer, the guiding mind and the trained hand. When nations in arms fight, the losses are not confined to any class, but industry, agriculture, and the professions alike suffer. Were there no financial loss or any moral decline as the result of the war the human loss would itself be serious and far-reaching upon the productive power of the peoples engaged.

Against this background how different a picture does our own favored land present! No lists of killed or wounded appear in our market places, nor does the sound of cannon disturb the progress of industry. The farmer's crops are not destroyed by the wheels of artillery; the sons of the laborer are not marshaled for slaughter; bombs do not fall from the heavens on peaceful dwellings, nor does the deadly submarine infest our coasts. Instead of debt we accumulate wealth; instead of adding fearful burdens we add enormous savings. Among all the great peoples our burden of taxation is the least; our public debts are negligible

as compared with our power to pay. The savings of our people in a single half year would extinguish them all or they could be canceled at once were the funds now on deposit in the savings banks of three of our states available for that purpose. We owe no dangerous debt either to others or to the future. Our problems are not so much those of how to carry a heavy load as they are those of the wise use of abounding strength.

It would not be right to fail to say that the relatively happy condition in which we fortunately stand carries with it problems that are serious. Were we to lose our heads and indulge in an orgy of speculations or assume that our immunity from the present dreadful ills under which others suffer is of necessity permanent, we might find ourselves in sad case. It is not an hour for boastfulness or for aggressive or exultant speech; it is a time for thankful self-restraint; for soberness of mind, for wisdom of counsel. This will be found more true if we look a little beneath the surface of our own affairs and see whether we ourselves are among the wasters of the world, and if so how and to what extent. It has always seemed a sad thing to me that while there are many among us ready to denounce the slaughter of war, they do not get actively excited over the needless slaughters of peace. A million may be contributed to prevent preparedness for defence lest it lead to war, but the contributions toward staying the things which slay in peace are not apt to be counted so liberally. True, we provide in peace, as in war, hospitals and curative establishments

on a large scale, which does honor to our generous liberality; but you yourselves are witnesses that he who seeks the large funds needed for preparedness in advance against the needless slaughters in peaceful times has a difficult task before him. Yet one need hardly say here that our needless death-roll in peace exhibits a burden of human pain and economic loss that is as frightful a waste as it is an unnecessary one. We spend, and in my judgment spend wisely, millions for a battleship against the possible coming of war. We do not spend, and in my judgment most unwisely fail to spend, sufficient sums to meet the certain coming of needless deaths in times of peace.

I take it that preventive medicine has it within its power to reduce our annual death-roll by half a million, and that if it had the funds and the authority it could within a few brief years at most produce this wonderful result. If I am correctly informed, we know what is to be done and how to do it and we have the organization through which the saving of pain and of loss can be effected. We lack as yet the vision to see, out of which must come the impulse to do.

One does not forget the fine progress that has been made and the growing successes that are achieved. Great are they and good, and honor to the men that have wrought them and are still working them out. They are as yet but a far-flung skirmish line. The battle is yet to come. We have yet to value our American lives so highly that the horror of needless typhoid deaths shall shock us as does a *Lusitania* or that the automobile death-roll in a

great city shall be esteemed a disgrace we burn to remove. When public opinion in America will no longer tolerate these needless deaths, the deaths will cease. It is your fine function to create the public opinion which shall work this mighty good.

Time forbids my speaking of the needless waste from preventable sickness, to which your fine work also applies. I must pass to speak briefly and finally of a waste not in death nor in health but in life and activity.

We are among the world's great industrial peoples, striving mightily for our place in the commercial sun. We need that place to keep our workmen employed and their families happy, but we omit a necessary thing to win and hold the position for which we strive. We train the physician for his job, the lawyer for his profession. We teach the veterinary how to care for the horse, and we even expect a dog doctor to know his job. We look likewise for the chiropodist and the manicure to have learned how to do their work intelligently. We have scattered widely and wisely schools that teach the farmer's son how most productively to toil. With exceptions, excellent indeed but all too rare, we are letting the city boy, the mechanic's son, go it alone. We pride ourselves on manual training and so-called technical schools, and one would not say a word in derogation of them and of the excellent though partial work that in places they do. None the less, it is substantially true that the great problem of teaching the artisan's sons and daughters how to labor productively is all but untouched. It has not

been so with our competitors abroad. But we have had a certain smug content with our system of education which has quite overlooked the fact that millions of our boys were being wasted. This is not because labor does not see the need. The statements of the American Federation of Labor on the subject of industrial education are almost or quite classics upon the theme. It is not because educators have failed to see the need. We are so busy with winning our way, so concerned with our own national, state, and local affairs that a great problem like the wasting of our youths has been almost untouched. Hence it has come to be that years of a young mechanic's life are wasted in the learning how to earn his living after he has reached the time of life when it is his desire and duty to earn that living. He picks up by all sorts of indirect and sometimes incorrect means the knowledge how to earn his daily bread. We teach him indeed much in our schools that is of value. I must not be understood in any sense as criticizing adversely the splendid work our teachers do. The profession of teacher is the great productive and the great underpaid profession of the land. I speak not of what is done but what is left undone, of the boy who, coming to the earning years of life and under circumstances which require his earning, knows not how to earn. I think of the needless loss of time and waste of manhood and womanhood and misdirected effort, of the patient waiting of parents, of the homes that are not established, of the moral loss to men and women arising because we leave millions of our

boys and girls without any training in the practical work of life. Here is weakness and a waste that may well alter the place of the United States in the commercial and industrial world.

Our leaders of industry are able and many of them are courageous; our financiers are astute and many of them have far vision; but the forces of industry led by the captain and the financier are largely untrained for the struggle, and until this training shall be supplied there will not only be a waste of human energy and sad suffering in many an humble home, but we shall not be able to reach the place of power in the commercial world to which by our ability, our character, and our wealth we are entitled.

Another waste is that which occurs when in every factory we fail to value the human being who works therein as better than the machine that he runs. Until we shall come to learn (those of us who conduct our industries) that the good will within the shop is better worth having than the good will without the shop, we shall not have reached the height at which we aim. Speaking as one who has had years of experience in factory life, it seems to me we have got to learn that two things are not to be tolerated either by public opinion or sound economics in an American factory: unnecessary sickness and unnecessary fatigue. I see in the public prints that little by little the eight-hour day is making its way. I am glad, because I believe from my experience in factories that we have too recklessly and quite unscientifically assumed that a human being could profitably labor

hard and continuously for a period which without any special thought or knowledge we have of recent years arbitrarily fixed in our minds at, say, ten hours. The whole history of industry, however, shows a steady reduction in the hours of labor and a steady increase in the compensation of labor, while at the same time there has been a steady decrease in the cost of labor. Some years ago I knew a manufacturer who came to the conclusion that there was what he called a "tired" hour; that the product of fatigue which we now know to be a true poison accumulated within the man and hampered him in his toil; so that in his judgment the last hour of a ten-hour day ought normally to be an unproductive hour relatively to the others. Acting on that at a time when there had been as yet no scientific study of the theme, he changed the hours in his shop unasked, unexpected, with the result that the product of his factory was rather larger and better in the shorter time than it had been before. I have often felt that the demand of labor for the shorter day ought to be studied sanely and soberly to see whether it had a physiological basis or not and to learn whether it might not be true, after necessary adjustments had been made, that the more limited time would, in the long run, prove the more productive time.

So I feel that we cannot tolerate longer in our shops the conditions of air, light, and other conditions of service which cripple or cramp our American manhood and womanhood. I would like to take the ladies here present to a great factory which I

have often visited in order that they might see what a modern hygienic factory might be. I took my wife and showed her fifteen hundred working girls working in white shirt-waists and dresses, sitting at their machines, with no shafting and belts and pulleys and no dust in the air and ample light, and in the winter evenings when darkness comes early, indirect lighting, invisible to the eye. I could show you those girls working shorter hours than their sisters, for higher pay, and then go down into the sales office and find that the products of that factory are sold in fifty countries all round the globe.

I have often thought of that shop when I have heard men say something in defence of the hideous theory of employing women's labor at the cheapest price that poverty would force it to accept. I could take you to factories on the older and the harder theory within fifty miles of the one of which I speak for which the owners wonder why they cannot get productive labor. The sad procession into many a modern mill of the untrained, the sadder procession out of that mill of the discarded and the overworked, is one of the pictures that a sane view of American life will some day cause to be removed.

We get very much worked up, you and I, over what we are sometimes pleased to call the exactions of the freight rates; but believe me, ladies and gentlemen, we suffer without knowing it something which costs us probably ten times as much, possibly many more times than that without knowing it. You have heard tonight

of the cost of the distribution of milk in this city. In Washington it has been found that a certain residential street was covered eight times by the competing wagons in distributing the milk supply. What could have been done at one delivery it took eight to do. We have almost left untouched in this country the tremendous problem of the cost of distribution. We have spent a lot of time and talk on the subject, important indeed, of transportation, but the greater problem we accept as if it were nothing. Yet it costs more to get a bushel of potatoes from the corner grocery to your home than it does to bring it five hundred miles from where it was grown to the corner grocery. It costs more to load a box onto a car in Chicago than it does to transport it from Chicago to New York when it is loaded. It costs more to put a barrel into a steamship in New York than it does to transport it to Liverpool after it is loaded. The cartage bill that is going on about us now is a bill probably equal to ten thousand millions a year—probably that. I think I may say safely, almost certainly, that, and possibly more. Yet to it we have given only sporadic thought, a better pavement here, an automobile truck there, a propaganda for good roads done largely because of the automobile traffic, and we have not yet come to realize that your city is taxed and mine is taxed and the whole country is burdened with a huge cost for distribution to which we have hardly commenced to apply our brains as yet.

We are using in this country less than half of our arable land—about 45

per cent. of it—and of the land we use but 12 per cent. is used as well as we know how. So far from having reached the point of real use of our land for food we are not using half, and of what we do use we use but 12 per cent. as well as we know how. Those facts were given me within a week by the Secretary of Agriculture and they throw a flood of light upon one of the essential wastes of American life. We talk volubly of the high cost of living and think not at all—often—of the reasons for that cost in what we do not grow when we know how to grow it and in what we spend upon distributing it, to which we give almost no thought. The head of a great department store told me that every package he delivered cost an average of seven cents for the delivery alone and that with some small packages, of which there were many, the cost of delivery was greater than the total profit on the sale, and in some cases, as in the case of bread, of which he sold a great deal, was more than the total amount he received for the same. And yet we pay the bill and do not think.

No city knows what the cost of cartage in its streets is. We wonder whether the freight rate will be 23 or 25 or 27 cents when it costs us more to get those same goods one block from the railway station to our store, and we give that almost no thought at all.

We permit the Mississippi River to flow its way unchecked to the Gulf. We encroach upon the waters of the rivers of Ohio and wonder why there are floods. Yet we are wasting credit

in failing to use it, that these things may be destroyed.

We talk about our national debt as if we had one. Yet we pay upon our debt a sum of interest less than Holland pays on hers and the lowest rate of interest in the known world, and much of that debt—one third of it in all—bears no interest whatever. With our hundred millions of people and a debt of a thousand millions of this character we think we have something to consider; whereas France before the war, with a population of almost one-third ours, had a debt of six thousand millions and has carried her war expenses since. We are not wise enough to see that this power of credit, wisely used, might put an end to the ravages of the Mississippi, might have saved the Dayton disaster, might have made many a home happy and content that was destroyed because we did not think. We seem to regard our swamps as a certain freak of nature with which we must be content, not realizing that the swamp can be made, if we choose, into a productive place for human food to grow and human labor to find its recompense. We neglect, for we are too busy to think, the use of our mighty and untouched credit to destroy known evils among us.

And finally we waste—and this comes more nearly to your theme—we waste in unused foods at a time when we talk as we do so much of the high cost of living—we allow abundant articles of food which all of the world but ourselves uses to go untouched, although they may be had in many parts of our country for the picking up. And here I want to speak briefly of the

scientific and practical work of one of the bureaus of the Department of Commerce in bringing before the people of the country good, abundant, cheap and unused foods. Let us take for example the case of the sea mussel, one of our best and most abundant marine foods. Millions of bushels of these sea mussels have been growing in the bays and estuaries of our Atlantic and Pacific coasts every year, but we, being ignorant of their actual value, have been wasting a food resource, worth possibly a million dollars annually, by failing to utilize it. This is a very strange state of affairs when we realize that in Europe for centuries the sea mussel had been one of the most highly regarded shell-fishes. France alone produces about four hundred million pounds annually and imports many millions more to satisfy the demand of the Parisian restaurants.

The investigators of the Bureau of Fisheries made chemical analyses of the mussel to determine the available food principles present, conducted metabolism experiments to determine the rate of digestion and the amount of nourishment absorbed by the body, and assured themselves that no poisons were present in the flesh. Then palatability experiments were made by having the bivalve served in different ways to the boarders of a large dining hall located near the laboratory. Persons who ate them were questioned concerning their texture, flavor, and the way they agreed with them, and the testimony was recorded. The actual cost of collecting and preparing the mussels for food was also determined.

The investigation revealed the surprising fact that the sea mussel, so long ignored by Americans, is superior to many aquatic articles which are commonly eaten. Hundreds of persons have pronounced it to be equal in flavor, or even superior, to the oyster; it is easily digested, has high nutritive value, is always in season, and is exceedingly abundant and general in its range. Especially for persons living on the coast it is an excellent, cheap food. Continued experiments revealed that the sea mussel is peculiarly adapted to preservation if proper care is exercised, and, when canned or pickled, will retain its flavor for months.

With these facts in hand, a campaign of education was started in Boston and vicinity in 1914 for the purpose of making known the qualities of the sea mussel. We were fortunate in securing the enthusiastic support of the President of the Boston Chefs' Club, through whom practically every local first-class hotel, club, and restaurant was induced to put sea mussels on the bills of fare, and we agreed to furnish small lots of mussels free of charge, with the understanding that they were to be given a conspicuous place and patrons were to be urged to order them. At the same time, a circular containing a popular account of the mussel, with approved recipes, was extensively distributed. Printed placards extolling mussels were provided for wholesale and retail merchants who would handle mussels obtained through the Bureau from beds whose sanitary condition was above suspicion. A barrel of mussels was placed in every police

station in Boston for free distribution to the members of the force, and next day every policeman in the city, as he went about his beat, was advertising the qualities of sea mussels. Push-cart vendors carried this cheap and wholesome food among those who did not frequent hotels, clubs and restaurants. Lectures were delivered and mussel dinners were arranged by agents of the Bureau, a lecture sometimes preceding a dinner. In a short time, the press of Boston, Lowell, Worcester, Providence, and other cities was giving the sea mussel daily attention.

The outcome of all this has been that the neglected sea mussel has become a regular and almost staple article of food in a number of eastern seaboard cities, that its reputation is extending to other cities, and that a permanent and growing mussel fishery has been established. Now some sixty stores in Boston are selling them and they have spread as far as Washington; and little by little an article of food more abundant than the oyster, more abundant than the clam and as good as either and without some difficulties that both have, is coming into use. Were you on the seacoast you could pick up in many places in an hour all that your family could eat for several days.

If you look in your Webster's dictionary for "tilefish" you will find that he was extinct in 1882. But he is not. One was sent to my family the other day. This is one of the finest of our food supplies quite untouched and almost unknown, a deep-sea fish, living in the purest waters of

the Atlantic, exceedingly abundant in some thousands of square miles of water, and unused simply because it is not known. We charter a fishing boat, we send it out to catch the tile-fish, we bring them in and give them away. Little by little, tactfully and slowly, we teach the American people that there are good things to eat which they do not use. There are many more of the kind and they are not confined to the Bureau of Fisheries. The Secretary of Agriculture could tell you the same thing.

Now I give you this little, apparently trivial, incident from our daily work as an illustration of our peculiar individual tendency as a people to waste. The thrifty Frenchman long ago utilized everything of the kind. If we could run America two or three years with equal thrift to that with which the Frenchman and his wife run France, we should add happiness, we should take away much of poverty, we should add to our savings enormously, not by millions or by hundreds of millions but literally by thousands of millions. There was a time in this country, my good friends, when we were all over-much exalted over our-

selves. I have heard it spoken of as the "spread-eagle days," when the eagle screamed and every speech began with reference to the Pacific and the Atlantic and the Gulf and the line of Canada. There was a time that followed that when it seemed as if nothing sufficiently bad could be said about the way things were in this country of ours, when the muck-raker had his day and he who would preach evil was supreme in the popular ear. I hope and believe that out of these two experiences a saner thought is coming to our country, of which your great movement is itself an evidence; a thought which shall not assume that we are wholly right, and certainly shall not assume that we are chiefly wrong, but which shall recognize with clear eye and with open mind the things we do which we ought not to do, the things we leave undone which ought to be done, and address ourselves to them patiently, in the fear of God and of no man, remembering that all things good take time to grow and hoping out of that growth to become even more than we are, the best and the greatest among the nations of the world.

THE ROLE OF THE NEWSPAPER IN THE DISSEMINATION OF PUBLIC HEALTH NEWS.

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Read before a General Session of the American Public Health Association, Rochester, N. Y.,
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Doctor Evans, out of his abundant experience, tells how to make of health matters such news that the papers will want to print it.

DURING the last ten years the gross death-rates of the larger American municipalities have not been lowered. The upward trend of health as measured by gross death-rates has come to an end—at least for a time. The reason is that in these cities the gross death-rates have reached an abnormally low level and, unless new lines of activity radical in their scope be undertaken, slight increases are inevitable.

You, gentlemen, who come from rural communities and smaller cities with newly organized health departments will be able to show rapid and marked reductions in your gross death-rates for several years. I am sure Doctor Biggs is right in his statement that New York State, outside of the very large cities, had a gross death-rate in 1914 that was much lower than that of 1913 and in his prediction of great saving in lives in New York State in the next few years. But, after a few years, you, too, will enter the years of diminishing returns.

The reason for the standstill in

the larger cities is this. You have reaped the effects of your campaigns against gross filth in water, in food, in streets, alleys and lots. You have gotten the good from campaigns to control contagion. Further improvement necessitates changes in the habits of individuals. To change customs and habits, powerful influences are required. The best agency for this type of activity is the school.

The next forward step will show itself in a great gain in efficiency and a small and temporary gain in death-rate. To bring these about, it will be necessary to improve personal hygiene. In order to improve personal hygiene, we must make use of the newspapers. Whether we like it or not, newspapers, as a part of the health machine, are here to stay. My opinion is that they are necessary for the salvation of curative medicine, but that is another story.

I do not know how well satisfied the public health men are with their efforts at obtaining publicity. If we are to judge by the effort put forth I should say that they are well satisfied. Newspaper offices are

flooded by the products of press services. I am sure that, from the newspaper standpoint, press services are being overdone. At this season of the year every large paper will receive press matter on typhoid fever from at least twenty sources. The stories are about the same. In this duplication there is great waste.

I suggest to the American Public Health Association that they investigate this subject to determine the possibility of eliminating some of this waste. Perhaps a way can be found for the Association, directly or indirectly, to serve the different state boards with press stuff ready to mail, or perhaps this Association can mail out press service matter for boards to lists prepared so as to prevent duplication. I do know that, under the present plan, newspaper offices are over-supplied, with the result that much helpful matter is thrown into the waste basket. To make matters worse, different schools of curative medicine—osteopaths, chiropractors, and chiropodists have recently established press services.

Whether articles are prepared by a central agency for a press service or by someone for a single paper, certain fundamental considerations must be borne in mind. A minority of the people want plain, scientific statements of facts, statistical matter and logical presentations of accurate information. But these are in the minority. Therefore, articles of this character must be the exception and not the rule.

The newspaper is the organization for gossip, evolved by our civilization

to meet the wants of our people. Health articles to be read and to influence the people must conform to the existing standards. Therefore, the major part of health articles must be gossipy and newsy. They must be flavored with personality. Either the writer must have personality known to the readers and they must read his accomplishments into his writings, or the writings must have personality. At least some of the articles must be written about or around persons or deeds or things.

Newspapers are interested in all forms of news. Their interest is not limited to gossip. Which suggests the question—What is news? The answer is—Whatever the people are interested in is news. This answer suggests this thought—if you succeed in interesting the people in health, health then becomes news. When health becomes news every newspaper will want to give the subject space. They will need no limitation. You need not even furnish them press matter. Therefore, whenever you stimulate interest on the part of the people in health, you stimulate the interest of the papers.

So long as health work consisted of public health, it was difficult to make health articles meet these requirements. Now that health work is becoming so largely personal hygiene, the avenues of approach to the individual have been increased enormously. It is much easier to interest a man in eating, drinking whisky or smoking than it was in the incident of beriberi among the Fijis.

I want to call your attention to

a group of newspapers of which few of us make any use and none of us make proper use. I refer to the newspapers which circulate exclusively among the great colonies of foreign-speaking people in the North and among negroes North and South. Just now, the hardest problem which health officers have to solve is how to lower the death-rates in the great foreign-speaking colonies in the North and the great colonies of negroes here and there. A health officer working in a community where the population is not homogenous finds his difficulties multiplied. The best avenue of immediate approach to these people is the newspaper written for them, in their own language and by their own people. We either make no use of these papers or else in writing for them we fail to comprehend their psychology or their sociology. We write to them from our, not their, point of view.

Of some importance is the censoring of news relative to health subjects. While the necessity relates especially to curative medicine, it occasionally relates directly and frequently relates indirectly to preventive medicine.

The city editor works under great pressure. He must pass almost instantly upon the questions presented to him. In his mind, the major question is—What is the news value of this story? However, he knows that no newspaper can permanently prosper if it permits its columns to be grossly used to deceive. News stories must be true in the main or the paper suffers. To the city editor there come stories of wonderful opera-

tions, new cures, discoveries in medicine, claims by physicians. How is he to decide which have merit and which are being launched for the purpose of exploitation? To my mind there is but one way to do. That is for the city editor to refer the matter to some one in whose opinion he has confidence.

The decision as to which stories reporters are to be sent out on is made about 8 a. m. in the case of afternoon papers and around noon in the case of morning papers. The stories brought in by reporters, telephoned in and telegraphed in are passed upon by the city editor about noon in the case of afternoon papers, and from 6 to 10 p. m. in the case of morning papers. The important hours therefore, are about noon for the afternoon paper and from 7 to 10 p. m. for the morning paper.

My opinion is that every newspaper should have some physician with whom its editors can consult on medical news in person or by 'phone. That physician should always be accessible in the case of afternoon papers from 11 a. m. to 2 p. m. and of morning papers from 8 to 10 p. m. It should be a paid service. Volunteer service by committees from the local medical society appointed for the purpose will not work.

Rarely is the paper with which I am connected an offender in this particular. It is a matter of frequent occurrence that we turn down a medical story and later find it in the columns of our competitors. I am sure that we have found it good

business policy to permit our competitors to scoop us on these stories.

The Sunday paper presents fewer difficulties but those presented are of a different character. With the exception of a few news pages the paper is printed on Thursday. This part of the paper is deliberately planned. There is ample time to consider carefully everything that appears in it. There is ample time to have all medical and health articles competently passed on. The trouble is that the ethical standards of the Sunday sections is lower than those of any other part of the paper. I think a very large part of this condition is due to the opinion of newspaper owners that the function of the Sunday paper is to entertain. In consequence, comics, cartoons, extravaganzas, establish the tone of the paper.

Now, the Sunday paper is minutely read. A very large portion of the readers sit down quietly and deliber-

ately go through the paper in detail. It is an exceptionally good field for health as well as other forms of propaganda work. As such it is almost unoccupied.

Articles for the Sunday pages should differ materially from those for the news pages. They can be very much more elaborately illustrated. They can carry pictures, charts and diagrams. Illustrations can be in colors in some instances. Some of the articles can be didactic in style. However, let us now forget that the majority of readers of the Sunday paper are in search of light matter. Matter may be light in substance or in manner of presentation. At least some of the articles should carry the truth to the readers of the Sunday pages in a manner which will engage their attention.

I recommend that you develop the possibilities of the Sunday paper for health and other medical propaganda work.

SIXTEEN HUNDRED CASES OF SICKNESS AND WHAT IS TO BE DONE ABOUT THEM.

Review of a Report on the Extent, Care and Prevention of Sickness in Dutchess County, Made by the Committee on Hospitals of the New York State Charities Aid Association.

EDWARD A. MOREE,
Assistant Secretary, State Charities Aid Association.

A COUNTY health association is being launched in Dutchess County, N. Y., by a committee of citizens in coöperation with the New York State Charities Aid Association that is significant in many aspects. Probably the most important feature of the new organization is that it enters the public health field not merely because a group of well-informed, public-spirited citizens happened to feel that the prevention of disease was an interesting and important bit of work, but chiefly because an investigation, covering typical areas of that county, had developed certain striking facts, that pointed clearly to the need for such an organization.

The investigation was conducted by the Committee on Hospitals of the State Charities Aid Association, at the request of the Thompson Trust a philanthropic foundation. It covered five districts selected for their representative character, with an aggregate population of nearly 12,000. One of these was the fourth ward of Poughkeepsie, which gave a typical urban community. The other four were the towns of Rhinebeck, Milan, Clinton and Stanford, which presented typical rural, large village and small village populations. The investigation, except for one town, covered a period of sixteen months. In this town data were collected for twelve months only.

The important facts pertaining to 1600 cases of illness were examined in the course of the investigation. In totals the situation developed was as follows:

786 were communicable,
673 were general medical and surgical,
141 were obstetrical,

Of the above: 987 patients were acutely ill,
452 were cases of chronic illness.

The investigation did not content itself, however, with discovering these important

facts in regard to sickness, but sought to discover just what such an amount of sickness meant in loss of time to the individuals and to the community. Of the 1,600 cases, 452, or 31.5 per cent., were chronic. It was practically impossible to discover how much time had been lost by them.

There were 987, however, acutely ill. These lost because of their illness, 41,244 days, a total

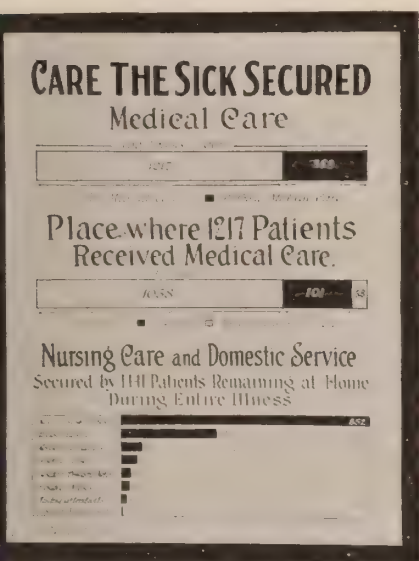
TYPES OF CASES FOUND			
Communicable	786	49	
Medical and surgical	673	12	
Obstetrical	141	09	
<i>Total</i>	1600	100	
Acute	987	62	
Chronic	452	28	
Miscellaneous	161	10	
<i>Total</i>	1600	100	
TIME LOST THROUGH SICKNESS by 987 Acute Cases.			
Children	1-5	13,256	32
"	6-11	13,716	33
Men	15-54	4,983	12
Women	15-54	4,838	12
Men and Women	55 and up	4,451	11
		<i>Total</i>	41,244

THE WASTE OF SICKNESS IN TIME LOST

of 113 years of incapacitation. Children from one to five lost 13,256 days; children of school age lost 13,716 days; men in the productive period of life, 15 to 54 years, lost 4,983 days, while women during the same period lost 4,838 days.

The report established conclusively that it is not poverty but lack of facilities that underlies the need for care for sickness, not only in cities but in rural communities. Seventy-six per cent. of the patients (1,217) had medical care—1,058 secured this in their own homes, 101 in hospitals and 58 both at home and in hospitals. Three hundred and eighty-three patients who remained at home were without any medical care whatever.

Of the 1,441 patients who remained at home during their entire sickness, 31 secured resident trained nursing service; 53 visiting trained nursing service; 77 resident untrained nursing service and 12 visiting untrained nursing service. In 2 instances, however, all the nursing that was done was done by a member of the patient's family.



CARED FOR AND UNCARED FOR SICKNESS
IN ASTONISHING TOTALS

It was found that 506 patients could have paid for any necessary service. Of these, however, only 81 per cent. were cared for adequately, while 19 per cent. were cared for inadequately. Eight hundred and eighty-two patients could have met any ordinary expenses. In other words, they were moderately well-to-do. They could have paid physicians' fees, practical nursing

and ward service in hospitals, but were not in financial circumstances to endure a prolonged drain. One-half of these received adequate care and one-half inadequate care. There were 212 patients who could not pay for medical and nursing service. Of these, only 32 per cent. received adequate care, while 68 per cent. were cared for inadequately.

Fifty-five per cent. of the patients who remained in their homes throughout their sickness were cared for adequately. Of those who went to the hospital 80 per cent. were cared for adequately, while 20 per cent. received inadequate care, chiefly because there was no hospital social service and follow-up work.

Of the 680 cases that were inadequately cared for, only 145 belonged to the dependent classes and were unable to pay for any care whatever. Ninety-eight of those inadequately cared for were well-to-do. Four hundred and thirty-seven of those inadequately cared for could have paid for the ordinary charges, but were unable to stand a prolonged illness and its drain on their incomes. In other words, poverty was not a controlling factor in the failure to secure care in 79 per cent. of the cases that were not properly cared for.

Absolute lack of facilities accounts for this failure in most cases. In other cases lack of proper knowledge as to the services needed and lack of knowledge as to where to seek it, were the controlling factors.

It is interesting to note that, according to the investigators, 72 per cent. of the 1,600 patients could have been cared for adequately in their own homes had there been available medical and nursing service. Twenty-eight per cent., or 442, however, could not have been cared for adequately in their own homes under any circumstances. Of these, 236 suffered from non-contagious diseases and needed hospital care because of the nature of their cases from a medical standpoint. Seventy-three patients suffered from contagious diseases and needed hospital care. With 133 cases, the impossibility of treating them adequately in their homes was due to crowded and unsanitary housing conditions, low grade mentality, ignorance, shiftlessness or poverty.

The importance of these findings and their significance as applied to practically every other

section of the country with similar population classes, is thus pointed out in the report:

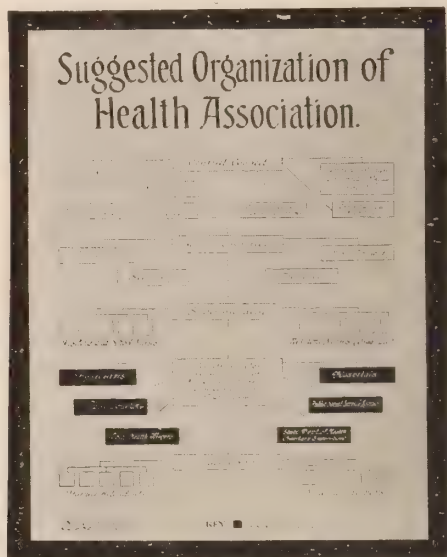
"The importance of the findings of the house-to-house canvass of selected districts of Dutchess County lies in the fact that there is every reason to believe that the amount of inadequately cared for sickness discovered is typical of what one may expect to find in very many other communities throughout the state and nation. Here is a group made up of a small city and several country communities in normal times—no unusual epidemics, no extraordinary social or industrial conditions—during a period shown by reported deaths, reported cases of contagious disease, and the unanimous testimony of physicians to have been a 'light year' for sickness. If Dutchess County varies from the normal, it varies in having had a better chance to improve itself than many other communities, for it has favorable conditions that other communities usually lack, as, for example, Vassar College, large charitable and benevolent endowments, wealthy and public-spirited citizens, nearness to a large city, and trunk line railroad service. If, under these circumstances, conditions are not what they ought to be, it is reasonable to suppose that in less favored communities they are at least equally bad.

"Reference to the section of the report treating of individual cases of sickness discovered will show the existence of many striking instances of neglect, of unnecessary and indefensible suffering and misery. As elsewhere in the state, the health work throughout Dutchess County is not sufficiently organized to be really efficient. Under present circumstances the general medical and surgical hospital facilities appear, on the face of things, to be inadequate. Just how far they could be made to meet the need, were disease producing conditions not so widely tolerated and were there an appreciable amount of organized home care of the sick and preventive work, is a subject that needs to be carefully studied.

"At the present time, except for Poughkeepsie's contagious disease hospital, there is no provision made for the isolation or care of contagious and communicable cases other than tuberculosis. In the rural districts especially, little effort has been made to check infection. There are, moreover, no facilities for the treatment of early psychopathic and alcoholic cases,

nor are there adequate provisions for the care of the feeble-minded and epileptic. Until the opening of the St. Francis Hospital in Poughkeepsie there had been no separate provision for the care of children. Whether the present facilities for maternity cases are sufficient, is also a matter which calls for careful consideration.

"The medical inspection of school children is most inefficient, and the after care which such inspection should necessarily involve is practically never given—at least in the rural sections. Rhinebeck Town is exceptional in this respect and, although the school nursing was intermittent until the winter of 1913-14, the importance of the work is recognized and continuous effort is being made to meet the problem presented."



DIAGRAMMATIC SCHEME FOR ORGANIZATION OF COUNTY HEALTH ASSOCIATION AND HEALTH CENTER

The Report is divided into two parts, The Findings and The Recommendations. The most important recommendation is the organization of a county health association. Of this the report says:

"Such organization might properly take the form of a county health association. At first this might be a private organization and very

might wisely remain such permanently, though from time to time many of its activities might be taken over by public agencies. This is not an unusual line of development. Examples may readily be adduced of private organizations demonstrating the need and feasibility of activities which are taken over later by the municipality or the state. A conspicuous one is the movement that is resulting in the wider use of the public school plant in New York City. Locally private initiative, coöperating with the Board of Education, makes the experiment. Having had its value and feasibility demonstrated, the Board of Education later takes it over as part of its own legitimate work. A similar development may not unreasonably be expected in connection with the establishment of a local health association under private auspices.

"While it is desirable that ultimately the proposed organization should cover the entire county, it would probably be better at the outset to organize the facilities in one or two of the districts, but in such a way as to admit of the gradual growth and extension of the organization throughout the county without radical change."

The objects of this association are graphically shown in charts A and B. The charts herewith shown, together with five others for which there was not space in this article, form an exhibit which will be used in promoting the organization of the County Health Association. Mr. Joseph J. Weber, Executive Secretary of the Committee on Hospitals of the State Charities Aid Association, prepared the exhibit. To him also belongs the credit for the organization of much of the material in the report.

CONSTRUCTIVE MEASURES

Program of
REMEDIAL WORK
to be carried out by
County Health Association.

- I. Organize an efficient system of
 - a. Medical Service
 - b. Nursing Service
Special of
District
Schools
Physician Attendants
 - c. Social Service
for the care of the sick in their homes and for the
care of the home during sickness
- II. Stimulate the provision of additional facilities
where and when needed, such as
 - a. Hospital beds for
General medical and surgical cases
Contagious diseases
Tuberculosis
Mental diseases
Alcoholism
Mental disorders
 - b. Out-patient clinics
At hospitals
In outlying rural districts

State of New York
Sanitary Code, Chapter 10, § 10.1

CONSTRUCTIVE MEASURES

Program of
PREVENTIVE WORK
to be carried out by
County Health Association

INDIVIDUAL HEALTH

Promotion of health of individual through instruction

- a. In Personal Hygiene
- b. Regarding nature of Communicable Diseases
- c. About the evil effects of bad housing and
unfit Social and Industrial Conditions

PUBLIC HEALTH

Adoption and strict enforcement of public health measures through

- a. Cooperation with the State Dept. of Health
- b. Cooperation with local health officers.
- c. Reform movements, as, for example,
 - (1) Improved child hygiene
 - (2) Better housing
 - (3) The prevention of feeble-mindedness, epilepsy
and tuberculosis

State of New York
Sanitary Code, Chapter 10, § 10.2

CHARTS A AND B

THE WORK THAT A COUNTY HEALTH ASSOCIATION WILL FIND TO DO

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MUNICIPAL HEALTH DEPARTMENTS IN SURVEY.

Much is spoken and written in these days celebrating the progress of the public health movement—so much that, while the fact of progress is not to be belittled, there is a real danger of confusing the vision with the reality. It is as if a merchant of optimistic nature should regale himself with the glowing statements of his publicity manager to the neglect of those of his more cool-headed accountants. For such reason the survey of the activities of municipal health departments by Mr. Franz Schneider, Jr., appearing in this issue of the JOURNAL is timely and significant.

In his study of the health departments of 219 of the larger cities of the United States, Mr. Schneider passes, as it were, a plane of dissection through each; the result is a composite cross-section which shows the status as regards a dozen chief, or test, health-protective activities in those cities. The picture thus presented, drawn as it is from answers to a questionnaire and necessarily without determination of the actual efficiency of the activities reported, must be taken as a very generous representation.

That fundamental index, the per capita appropriation for direct health protection, fittingly heads the subject-matter of the investigation, and a most striking finding appears in the enormous variations reported for that figure, which ranges all the way from 2 to 98 cents for the individual cities. By grouping the cities according to size throughout the study a general rule is deduced: "that in every case the larger cities made the better showings, receiving relatively more money from the public treasury and carrying on larger and more intensive programs. . . . that is, the inhabitants of the larger cities are receiving better protection from preventable disease." Striking regional variations also are shown. Such facts (among others) as that over half of the cities reported no proper organization to combat infant mortality, and that less than a quarter had a coherent

program against tuberculosis, lead to the conclusion that "public health work in this country is still in its infancy—certainly as far as application of established scientific methods is concerned."

In explanation, though not in justification, of such facts, it may be said that the modern public health movement in the United States is young and is dependent upon development of civic consciousness for its organization and fruition. Indeed, conservation in general was not thought of until the disregard of the waste concomitant with the rapid growth of the country had become almost proverbial. Health protection extends naturally, as civic consciousness develops, from urban to rural communities, a fact shown almost mathematically by the lesser decline of certain rural, as compared with urban, death-rates in recent years. This extension is, however, by no means a mechanical evolution, nor is the size of a city a guarantee of its health control. Throughout there are involved two factors, motive or obstructive, both personal—the disposition of the community and that of the health officer. It is to their interaction—or inaction—that those variations in Mr. Schneider's findings which do not depend on local physical differences must be ascribed. The "minimum wage" for health departments, which is reemphasized in the paper, can be obtained only where there is the convincing influence and activity of an executive who has his own convictions as to betterment. "Far too many of our city health departments undertake far too little in proportion to their opportunities; on the other hand, all too few are allowed an anywhere near adequate appropriation" sums up the situation. But the health departments are fortunately not in the case of that discouraged young man who had "a fine future behind him"; their future is at hand. The optimist will turn his gaze from their deficiencies to their possibilities.

PUBLIC COMFORT

"The most *flagrant failure* in American sanitation today is the *almost universal lack* of public convenience or comfort stations in American cities and towns. The stranger within the gates of most American communities seeks in vain for any public sanitary conveniences. If he is well dressed he must be referred to hotels or other semi-public buildings; or, if poorly dressed, to saloons or railroad stations or other semi-private or public service stations."—Professor William T. Sedgwick, in Presidential Address, American Public Health Association, at Rochester, 1915.

A clarion call to action! And not a futile one. As a direct outcome, "A National League for Insistence on Proper Provision for the Common Decencies of Life," has been formed by Cressy L. Wilbur, chief statistician of the New York State Health Department. With the exception of its honorary head, Professor Wm. T. Sedgwick, it has no officers, and it is further unique in possessing no rules, regulations, annual meetings, dues, and no definite program. The JOURNAL extends to this extraordinary organization its cordial support.

Unfortunately, comfort station development in this country has been hindered by four mistaken policies. They have been unnecessarily large and consequently unnecessarily expensive. The average cost of the nine comfort stations built and maintained by the Department of Public Works in New York City, all constructed between the years 1898 and 1908, was \$25,500. As reported by Dr. D. B. Armstrong, in "A Social Sanitary and Economic Survey of Comfort Stations in New York City," published by the Bureau of Public

Health and Hygiene of the New York Association for Improving the Condition of the Poor, these stations, owing to their large size, are seldom used to anything like their capacity. Smaller, less expensive stations would serve the same purpose and at the same time permit of the erection of greater numbers. Better two smaller comfort stations than one large one. The small, inexpensive but architecturally agreeable urinal, such as can be erected for \$1,500 to \$2,000 and operated at an exceedingly low figure, is a necessity which continental cities have long recognized, but which this country has entirely failed to meet.

The second mistake has been the failure to develop for public use the available toilet facilities in subway and elevated stations and in public buildings. In the present New York City subway system there are 150 separate toilets which are as yet inaccessible to the pedestrians without the payment of 5 cents in order to pass by the ticket chopper. Slight alterations of railings and the adjustment of a few minor difficulties are all that restrict these available resources from free public use, though additional equipment and better janitorial service might be necessary—a charge that might be met by the city and not the operating companies. In accordance with a similar principle, strictly public buildings should make the use of toilet facilities easy instead of difficult.

Comfort station development has also suffered through a lack of adoption of many minor conveniences. A comfort station should be a convenience station in every sense of the word. The commendable practice of providing hot and cold water and soap and towel, private pay toilets, comb, brush, towel and sanitary napkin vendors to supply the articles at a moderate cost, a telephone booth, bootblack stand, check room for parcels, city directory and the like, has only recently been considered in this country, although European cities for many years have made these conveniences a feature of their public service.

Lastly, the cost of comfort station operation and maintenance has been unnecessarily high, ranging from \$3,000 to \$6,000 a year. The ten comfort stations under the Department of Public Works cost New York City an average of \$5,250 to operate and maintain in 1912. The city of London operated and maintained 316 comfort stations at an average cost of \$1,350; but the receipts from pay privileges, amounting to \$850 a station, reduced the net cost to \$500. Of the few instances of similar policy in this country, Washington affords the best example with an income of about \$2,400 and an expenditure of \$3,600.

No thoughtful man can deny that there is a need of comfort stations in American cities. Whether accurate or grossly exaggerated, the reported yearly attendance of over twelve million persons for Brooklyn's six comfort stations would indicate that the existing stations were more than ornamental, and this immense sanitary need translated in terms of the conditions of our 229 cities and towns of over 25,000 should startle public officials into a realization that "The most flagrant failure in American sanitation today is the almost universal lack of public convenience or comfort stations in American cities and towns."

A COMPARISON OF THE ACID PRODUCTION OF THE BACILLUS COLI GROUP ISOLATED FROM VARIOUS SOURCES.

WM. W. BROWNE, Ph. D.,
The College of the City of New York.

DURING the last five years, the Shell Fish Commission of the State of Rhode Island has undertaken a very active campaign against the pollution of the oyster beds of the state by the sewage of the cities and towns, not only of Rhode Island, but of Massachusetts as well, bordering upon Narragansett Bay. Early in the work a preliminary sanitary survey was made of Narragansett Bay to determine the extent of the pollution, under the direction of Prof. F. P. Gorham of Brown University and Bacteriologist to the Rhode Island Shell Fish Commission. The writer had the pleasure of working under his direction during the survey and takes this opportunity of thanking him for the use of the data and for his many and helpful suggestions during the progress of the work.

As in all sanitary surveys of this nature, the *Bacillus coli* group was taken as the index of pollution. But as the work progressed and the pollution was found to be so general throughout the bay, it was seen immediately that some method must be devised by which the members of the *Bacillus coli* group might indicate by some chemical or physiological reaction, the recentness or remoteness of pollution and thus readily give ideas as to the centers or foci of pollution. It was thought, perhaps, the ability of the group to

break up carbohydrate solutions with the production of acid might serve as a criterion. The production of acid by the various members was found to be a very constant factor and much more stable than the per cent. of gas which in turn depends greatly on the reaction of the medium. As a result, these few experiments were devised to bring any such difference, if it existed, in the amount of acid produced in the various carbohydrate solutions by the members of the *Bacillus coli* group isolated from various sources.

In general, the various members of the *Bacillus coli* group considered in this work were isolated from three main sources: (1) from the stools of students and assistants in and around the laboratory; (2) from the stools of Italian immigrants detained aboard the *S. S. Roma* undergoing examination for the presence of the cholera vibrio; (3) from oysters taken from 240 stations in Narragansett Bay, varying from those beds near the ocean which were comparatively free from pollution to those situated nearer the cities and towns which were always more or less badly polluted.

The various members of the *Bacillus coli* group were isolated from litmus lactose agar plates made by plating out the juice of the oysters taken from the various stations or an emulsion made from the fecal material. After

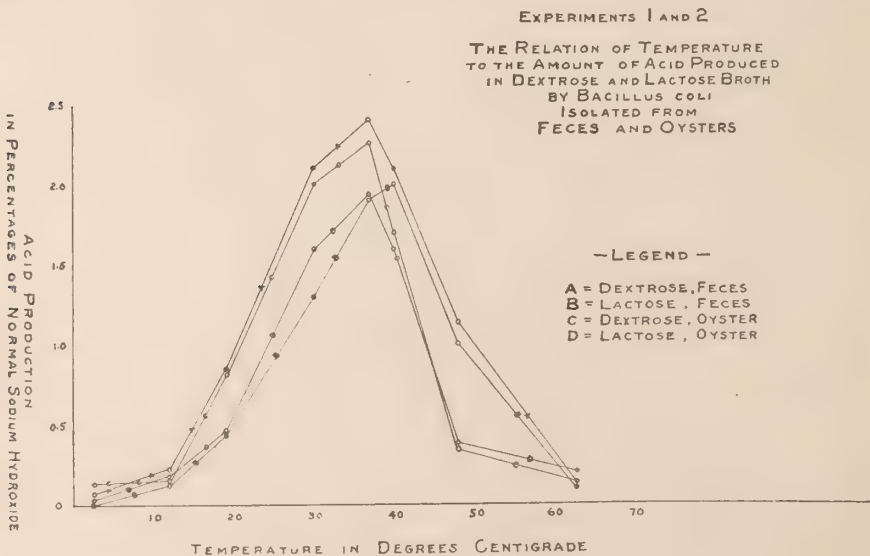
identification (gas in lactose peptone bile) inoculations were made into the various carbohydrate media by the addition of a half cubic centimeter of a twenty-four hour-old peptone culture. More uniform results were obtained by this method of inoculation than by inoculation from the agar steak direct by using the platinum needle. Unless otherwise stated the cultures were grown at 37° C. and titrated at the end of the twenty-fourth hour with N/20 sodium hydroxide using phenolphthalein as an indicator. The method of titration used is indicated on page 126 of the Standard Methods of Water Analysis and it was followed in detail. The results of the work are expressed in per cents. normal.

The culture media used during the progress of the experiment was made by the author according to Standard Methods. Great care was taken in adjusting the reaction of the media

and all lots were made as uniform as possible. Liebig's Meat Extract (3 grams to the liter) was used instead of meat as it was cheaper and seemed to fit our needs as well and at the same time the cultures seemed to grow as well. The oysters were examined according to the methods proposed in the Standard Methods of Shell Fish Examination. The juice was collected on sterile Petri dishes from which it was plated on litmus lactose agar and the various strains isolated as previously indicated. Controls were used in all experiments.

EXPERIMENTS 1 AND 2. THE EFFECT OF TEMPERATURE ON THE PRODUCTION OF ACID IN DEXTROSE AND LACTOSE BROTH BY THE BACILLUS COLI GROUP ISOLATED FROM FECES AND OYSTERS.

Tubes of dextrose and lactose broth were inoculated with $\frac{1}{2}$ cc. of a twenty-



four-hour broth culture of the *Bacillus coli* group isolated from feces and oysters and incubated at the following temperatures (Centigrade) 3-12-19-30-37-40-48-63 for 24 hours. At the

end of that period, the tubes were removed from the incubator and titrated with N/20 sodium hydroxide. The following tables are the result of the titrations.

EXPERIMENT 1.

AMOUNT OF ACID PRODUCED IN DEXTROSE AND LACTOSE BROTH AT DIFFERENT TEMPERATURES BY *BACILLUS COLI* ISOLATED FROM FECES.

	3°C.	12°C.	19°C.	30°C.	37°C.	40°C.	48°C.	63°C.
Dextrose.....	0	0.2%	0.85%	2.1%	2.3%	2.15%	1.1%	0.1%
Dextrose.....	0.2%	0.25	0.85	2.1	2.4	2.1	1.1	0.15
Dextrose.....	0	0.2	0.85	2.1	2.4	2.05	1.2	0.15
Average.....	.06	0.22	0.85	2.1	2.4	2.1	1.13	0.13
Lactose.....	0	0.2	0.5	1.3	1.9	2.0	1.05	0.1
Lactose.....	0	0.1	0.4	1.35	1.9	2.0	0.95	0.1
Lactose.....	0	0.1	0.4	1.3	1.9	2.1	1.0	0.1
Average.....	0	0.13	0.43	1.3	1.9	2.0	1.0	0.1

EXPERIMENT 2.

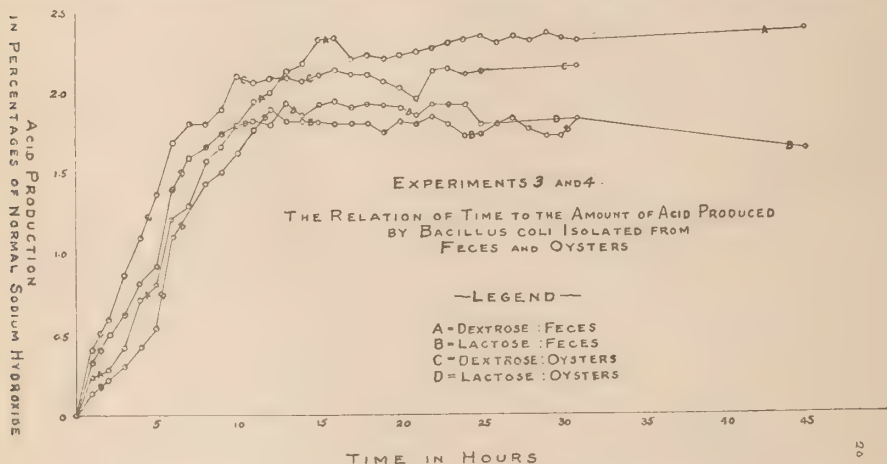
AMOUNT OF ACID PRODUCED IN DEXTROSE AND LACTOSE BROTH AT DIFFERENT TEMPERATURES BY THE *BACILLUS COLI* ISOLATED FROM OYSTERS.

	3°C.	12°C.	19°C.	30°C.	37°C.	40°C.	48°C.	63°C.
Dextrose.....	0.2%	0.2%	0.9%	2.0%	2.3%	1.7%	0.35%	0.2%
Dextrose.....	0.1	0.15	0.8	2.0	2.3	1.7	0.35	0.1
Dextrose.....	0.1	0.1	0.8	2.0	2.2	1.7	0.3	0.1
Average.....	0.13	0.15	0.83	2.0	2.26	1.7	0.33	0.13
Lactose.....	0.1	0.15	0.50	1.6	1.95	1.4	0.35	0.2
Lactose.....	0	0.2	0.40	1.6	1.9	1.6	0.35	0.2
Lactose.....	0	0.2	0.45	1.7	1.9	1.7	0.35	0.2
Average.....	0.03	0.18	0.45	1.6	1.92	1.6	0.35	0.2
Control.....	0	0	0	0	0	0	0	0

From Experiments 1 and 2 it may be seen that the members of the *Bacillus coli* group isolated from either feces or oysters produced their maximum amount of acid at 37° C. or body temperature when incubated for 24 hours. Those cultures isolated from feces generally produce more acid than those cultures isolated from oysters. This seems to be true especially in the case of the mono-saccharide dextrose where the fecal cultures always produced more than the cultures isolated from the oysters. The distinction is not quite so clear in the case of the disaccharide lactose. Below 37° C. the cultures from isolated oysters produce

more acid while above 37° C. the cultures isolated from feces produce more acid. The disaccharide on the

meter of a twenty-four-hour peptone culture of *Bacillus coli* group isolated from feces and oysters. These tubes were incubated at 37° C. and at intervals of one hour three tubes of each inoculated carbohydrate solution were removed from the incubator and titrated with N/20 NaOH. The following tables are the results of the titration.



more acid while above 37° C. the cultures isolated from feces produce more acid.

EXPERIMENTS 3 AND 4. THE RELATION OF TIME TO THE AMOUNT OF ACID PRODUCED BY THE *BACILLUS COLI* GROUP ISOLATED FROM FECES AND OYSTERS.

Tubes of dextrose and lactose broth were inoculated with $\frac{1}{2}$ cubic centi-

lactose. There seems to be no difference between the cultures as to their respective sources. Again, in the monosaccharide dextrose we find the cultures isolated from feces producing a greater amount of acid—after the twelfth hour at least—than the cultures isolated from the oysters. From the twelfth hour on it always produced more acid. The disaccharide on the

Controls titrated at the end of the twenty-fourth hour were neutral in reaction.

EXPERIMENT 3.

RESULT OF THE TITRATIONS AT INTERVALS OF ONE HOUR OF THE *BACILLUS COLI* ISOLATED FROM FECES.

Temp.	Hour.	Dextrose culture.				Lactose culture.			
		1.	2.	3.	Aver.	1.	2.	3.	Aver.
37°C	1	0.2%	0.25%	0.25%	0.23%	0.15%	0.15%	0.15%	0.15%
"	2	0.3	0.25	0.3	0.28	0.2	0.2	0.25	0.21
"	3	0.4	0.45	0.4	0.41	0.35	0.25	0.3	0.30
"	4	0.75	0.8	0.65	0.73	0.45	0.45	0.4	0.43
"	5	0.8	0.85	0.85	0.83	0.5	0.55	0.6	0.55
"	6	1.3	1.2	1.2	1.23	1.0	1.1	1.3	1.1
"	7	1.3	1.2	1.4	1.3	1.3	1.3	1.3	1.3
"	8	1.5	1.6	1.6	1.56	1.4	1.4	1.5	1.43
"	9	1.7	1.6	1.7	1.66	1.4	1.5	1.6	1.5
"	10	1.85	1.8	1.75	1.8	1.6	1.6	1.7	1.63
"	11	2.0	1.9	2.0	1.96	1.8	1.85	1.7	1.78
"	12	2.2	2.1	1.95	2.0	1.96	1.9	1.9	1.9
"	13	2.2	2.1	2.1	2.13	1.8	1.75	1.9	1.81
"	14	2.25	2.2	2.1	2.18	1.85	1.95	1.85	1.81
"	15	2.3	2.4	2.25	2.31	1.75	1.8	1.9	1.81
"	16	2.3	2.3	2.35	2.31	1.8	1.7	1.9	1.8
"	17	2.3	2.3	2.2	2.2	1.8	1.7	1.9	1.8
"	18	2.25	2.25	2.2	2.23	1.8	1.8	1.8	1.8
"	19	2.25	2.2	2.2	2.21	1.75	1.8	1.75	1.76
"	20	2.15	2.35	2.2	2.23	1.8	1.85	1.8	1.81
"	21	2.25	2.25	2.2	2.23	1.8	1.8	1.8	1.8
"	22	2.3	2.3	2.25	2.28	1.9	1.8	1.8	1.83
"	23	2.3	2.3	2.3	2.3	1.8	1.8	1.8	1.8
"	24	2.3	2.35	2.3	2.31	1.7	1.8	1.7	1.73
"	25	2.3	2.4	2.3	2.33	1.7	1.7	1.8	1.73
"	26	2.3	2.2	2.4	2.3	1.8	1.8	1.8	1.8
"	27	2.5	2.3	2.3	2.35	1.7	1.9	1.9	1.83
"	28	2.3	2.35	2.3	2.31	1.65	1.9	1.8	1.78
"	29	2.35	2.35	2.35	2.35	1.9	1.6	1.7	1.73
"	30	2.25	2.4	2.3	2.31	1.7	1.8	1.7	1.73
"	31	2.3	2.3	2.3	2.3	1.9	1.8	1.8	1.83
"	45	2.3	2.2	2.3	2.36	1.75	1.8	1.75	1.73

other hand is more variable and the cultures from the oysters produce just as much and even more at times than

the fecal cultures. No distinction can be made in the case of the disaccharide.

Controls titrated at the end of the twenty-fourth hour were neutral in reaction.

EXPERIMENT 4.

THE RESULT OF THE TITRATIONS AT INTERVALS OF ONE HOUR OF THE BACILLUS COLI ISOLATED FROM OYSTERS.

Temp.	Hour.	Dextrose culture.				Dextrose culture.			
		1.	2.	3.	Aver.	1.	2.	3.	Aver.
37°C	1	0.4%	0.4%	0.4%	0.4%	0.4%	0.3%	0.35%	0.35%
"	2	0.6	0.6	0.6	0.6	0.6	0.5	0.4	0.5
"	3	0.9	0.85	0.9	0.88	0.6	0.6	0.7	0.63
"	4	1.1	1.1	1.1	1.1	0.8	0.8	0.9	0.83
"	5	1.35	1.4	1.4	1.38	0.95	1.0	0.95	0.96
"	6	1.6	1.7	1.7	1.66	1.4	1.4	1.4	1.4
"	7	1.8	1.8	1.8	1.8	1.55	1.65	1.6	1.6
"	8	1.95	1.8	1.9	1.8	1.6	1.6	1.75	1.65
"	9	1.9	1.9	1.9	1.9	1.6	1.8	1.85	1.75
"	10	2.1	2.0	2.1	2.1	1.7	1.9	1.8	1.8
"	11	2.0	2.1	2.1	2.06	1.8	1.9	1.8	1.83
"	12	2.1	2.15	2.0	2.08	1.8	1.8	1.8	1.8
"	13	2.05	2.0	2.15	2.1	1.9	2.0	2.0	1.96
"	14	2.1	2.1	2.05	2.08	1.8	1.9	1.9	1.86
"	15	2.1	2.1	2.1	2.1	1.9	1.95	1.9	1.91
"	16	2.1	2.2	2.1	2.13	1.9	2.0	1.95	1.95
"	17	2.1	2.1	2.1	2.1	1.95	1.95	1.8	1.9
"	18	2.0	2.2	2.1	2.1	1.9	2.05	1.8	1.91
"	19	2.05	2.05	2.1	2.06	1.8	1.9	1.9	1.86
"	20	1.9	2.1	2.1	2.03	1.9	2.0	1.8	1.9
"	21	2.0	1.8	2.05	1.95	1.8	1.9	1.9	1.86
"	22	2.1	2.15	2.15	2.13	1.9	2.0	1.9	1.93
"	23	2.2	2.0	2.2	2.13	1.9	1.6	1.9	1.8
"	24	2.1	2.1	2.1	2.1	2.0	1.9	1.9	1.93
"	25	2.05	2.15	2.15	2.11	1.9	1.8	1.7	1.8
"	31	2.2	2.1	2.1	2.13	1.8	1.8	1.9	1.83

EXPERIMENTS 5 AND 6. THE AMOUNT OF ACID PRODUCED IN VARIOUS CARBOHYDRATE SOLUTIONS BY MEMBERS OF THE BACILLUS COLI GROUP ISOLATED FROM FECES AND OYSTERS.

In these experiments tubes containing the various carbohydrates in

question were inoculated $\frac{1}{2}$ cubic centimeter of a twenty-four hour peptone culture of the Bacillus coli group isolated from feces and oysters. The carbohydrate tubes were incubated for twenty-four hours after which they were removed and titrated with N/20 sodium hydroxide.

EXPERIMENT 5.

ACID PRODUCED IN VARIOUS CARBOHYDRATES BY BACILLUS COLI ISOLATED FROM FECES.

	Cultures.										Average.
	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	
Dextrose	2.4%	2.3%	2.4%	2.3%	2.2%	2.4%	2.1%	2.2%	2.3%	2.3%	2.29%
Levulose	2.3	2.4	2.3	2.4	2.4	2.4	2.3	2.3	2.3	2.4	2.35
Galactose	1.9	1.7	1.8	2.0	2.0	2.1	2.0	2.0	1.8	1.8	1.91
Arabinose	2.2	2.0	1.9	2.0	1.9	1.9					1.98
Xylose	1.9	2.1	2.0	1.9	2.0						1.98
Isodulcite	2.2	2.2	2.0	2.0	2.0	2.1	2.1	1.9	1.6	1.6	1.97
Mannite	2.0	2.0	2.0	2.0	2.0	2.0	2.1	2.1	2.0	2.1	2.03

Average of monosaccharides and hexites..... 2.07

Lactose	1.9	1.8	1.9	1.8	1.9	1.7	1.8	1.7	1.6	1.9	1.8
Maltose	1.8	2.35	2.1	1.9	1.3	1.6	2.3	2.0	2.2	2.2	1.97

*Average of disaccharides..... 1.88

Raffinose	1.7	1.55		1.6		1.3					1.53
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Average of trisaccharide..... 1.53

*No acid produced in saccharose by these cultures.

The following tables give the results of the titrations.

Bacillus coli isolated from feces produces more acid in the monosaccharides and hexites, less in the disaccharides, and least in the trisaccharide.

Bacillus coli isolated from oysters produce most acid in monosaccharides, less in disaccharides, and least in the trisaccharide.

Two results seem to stand out very clearly from the titrations of Experiments 5 and 6. The members of the

Bacillus coli group, whether isolated from feces or oyster, seem to show a marked preference for certain carbohydrates. It might be said that the amount of acid produced by the colon group varies inversely as the complexity of the sugar. We find the largest amount produced in the monosaccharides, less in the disaccharides and least in the trisaccharide. That would be expected from the known complexity of the molecule as we go from the mono, through to the trisaccharides. Among

the monosaccharides we find some variation. Both cultures seem to favor

EXPERIMENT 6.

ACID PRODUCED IN VARIOUS CARBOHYDRATES BY BACILLUS COLI ISOLATED FROM OYSTERS.

Culture.				
	1.	2.	3.	Average.
Dextrose.....	2.2%	2.1%	2.0%	2.1%
Levulose.....	2.2	2.2	2.1	2.16
Galactose.....	1.5	1.8	2.0	1.76
Arabinose.....	1.6	1.8	1.9	1.76
Xylose.....	1.65	1.8	1.6	1.68
Isodulcite.....	2.05	1.9	1.5	1.81
Mannite.....	2.1	1.9	2.0	2.0

Average of monosaccharides and hexites. 1.89

Lactose.....	1.6	1.7	1.8	1.7
Maltose.....	1.9	1.2	1.8	1.63

*Average for disaccharides..... 1.66

Raffinose.....	1.3	1.6	1.5	1.46
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Average for trisaccharide..... 1.46

*No acid produced in saccharose by these cultures.

dextrose and levulose and do not attack galactose so well. Maltose seems to be broken down more easily than lactose by both the fecal and oyster cultures. Among all cultures, however, those cultures which were isolated from feces seem to produce more acid in all the various carbohydrates than the cultures isolated from oysters.

SUMMARY OF EXPERIMENTS 5 AND 6.

	B. coli isolated from feces.	B. coli isolated from oysters.
Dextrose.....	2.29%	2.1%
Levulose.....	2.35	2.1
Galactose.....	1.91	1.76
Arabinose.....	1.98	1.76
Xylose.....	1.98	1.68
Isodulcite.....	1.97	1.81
Mannite.....	2.03	2.0
Lactose.....	1.8	1.8
Maltose.....	1.97	1.63
*Raffinose.....	1.53	1.46

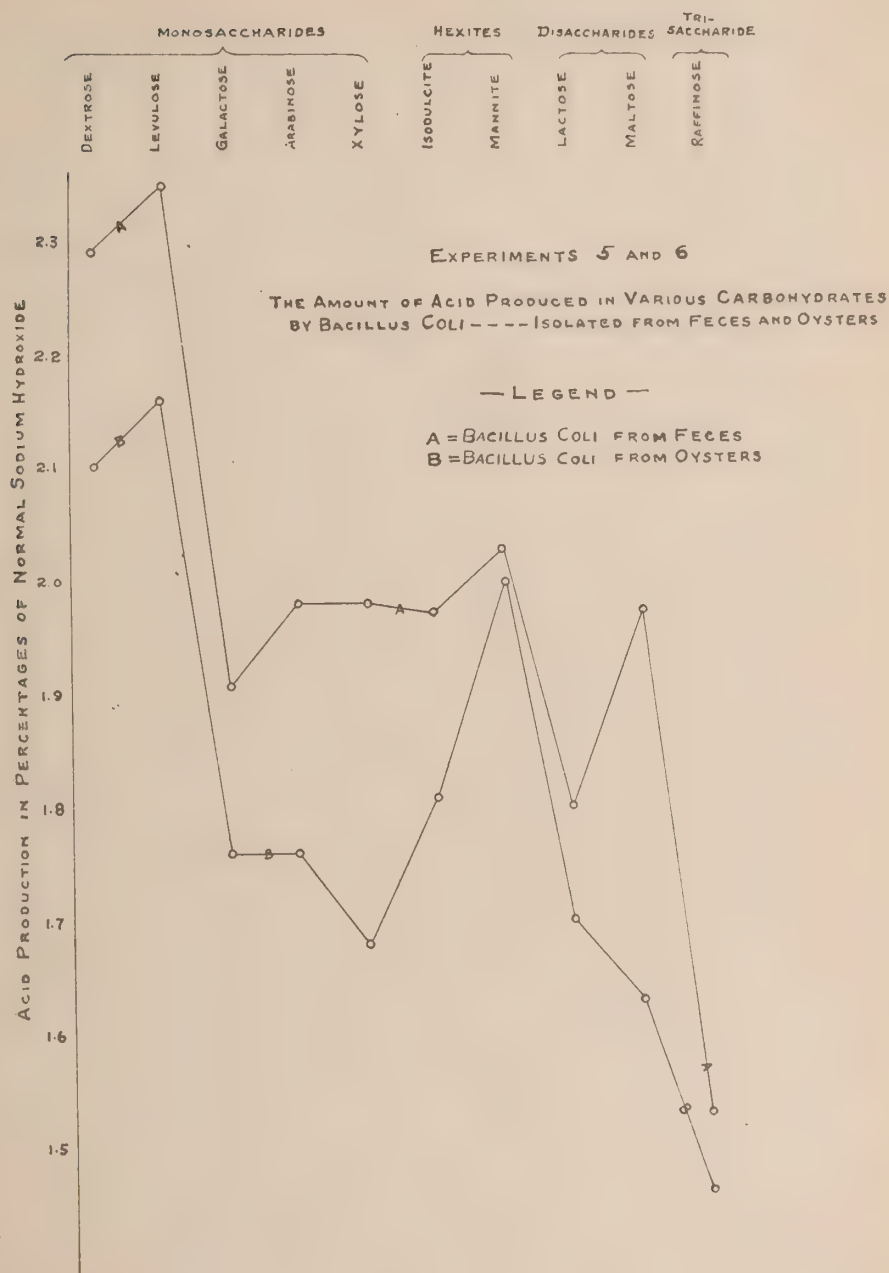
*No acid produced in saccharose.

EXPERIMENT 7.

A COMPARISON BETWEEN THE AMOUNTS OF ACID PRODUCED BY THE BACILLUS COLI GROUP ISOLATED FROM VARIOUS SOURCES.

In this series of experiments a comparison has been made between the amount of acid produced in various carbohydrates by the different members of the *Bacillus coli* group isolated from different sources. The *B. coli* used in the experiments were isolated from three distinct sources: (1) from stools of healthy individuals in and about the laboratory (2) from stools of Italian immigrants quarantined on board the *S. S. Roma*; (3) from oysters taken from different locations in Narragansett Bay, representing areas of widely diversant character.

The organisms isolated from the above named sources and identified



as members of the *Bacillus coli* group were inoculated into tubes of peptone broth which were incubated at 37° C. for twenty-four hours. The various carbohydrates were inoculated by the addition of $\frac{1}{2}$ cubic centimeter of this twenty-four-hour culture. At the end of a twenty-four-hour incubation at 37°C., the cultures were titrated with N/20 sodium hydroxide.

Experiment 7 seems to indicate that the members of the *Bacillus coli* group

EXPERIMENT 7.

Dextrose.			
	Laboratory.	Roma.	Oysters.
Number of cultures	24	95	260
Highest.....	2.4	2.3	2.40
Lowest.....	2.1	1.75	1.00
Average.....	2.28	2.06	1.89
Laboratory..... 2.28			
Roma..... 2.06			
Oysters..... 1.89			
Lactose.			
	Laboratory.	Roma.	Oysters.
Number of cultures	24	95	260
Highest.....	2.0	1.96	2.25
Lowest.....	1.2	1.40	1.10
Average.....	1.79	1.75	1.72
Laboratory..... 1.79			
Roma..... 1.75			
Oysters..... 1.72			

isolated from feces produced on the whole more acid than cultures isolated from oysters. In this series it is just as true in the case of disaccharides as in the case of the monosaccharides, although the difference in the case of the disaccharides is much less than in the monosaccharides. In this experiment is also pointed the fact that the race or diet may have some effect on the activeness of the members of the *Bacillus coli* group to produce acid in carbohydrate solutions as indicated in this experiment. The cultures isolated from the passengers on the *Roma* (Italian) produced less acid than those isolated from the stools of the laboratory assistants.

SUMMARY.

The members of the *Bacillus coli* group isolated from feces produce more acid in carbohydrate solutions than cultures isolated from oysters in Narragansett Bay.

This difference is more marked in the case of the monosaccharide dextrose than the disaccharide lactose.

The members of the *Bacillus coli* group isolated from feces and oysters produce their maximum amount of acid at 37°C. and by the end of the twenty-fourth hour.

The greatest amount of acid is produced in the monosaccharides less in the dissaccharides and least in the trisaccharides.

REPORT OF THE COMMITTEE ON OCCUPATIONAL MORTALITY.

Committee, DR. W. F. SNOW, Chairman, DR. JOHN B. ANDREWS, MRS. JOHN B. ANDREWS, DR. LOUIS I. DUBLIN, DR. J. W. TRASK.

Presented before the Vital Statistics Section of the American Public Health Association, Jacksonville, Fla., December, 1914.

IN PRESENTING its report for consideration, the Committee desires at the outset to define the field of inquiry which it believes should be covered. The section on Vital Statistics has generally been recognized as dealing with deaths, births and marriages. In a study of occupational mortality, the Committee believes it essential to include morbidity as related to occupation. A study of economic conditions and the slow working changes of physical and mental deterioration—the health-hazards—due to occupational requirements and environment are essential to a profitable study of the problem, and these data can be obtained with completeness only during the lifetime of the patients. The Committee also believes that the possible application of studies in occupational mortality should be steadily borne in mind, and has therefore included brief reference to needed legislative and administrative measures which demand serious consideration by public authorities and private agencies.

Accordingly, as a basis for its discussions, the Committee has assumed that the field of inquiry covered not only occupational mortality, but also morbidity and certain predisposing factors. Death is the culmination of a process. Deaths from occupational

diseases are preceded by longer or shorter periods of illness. These deaths are largely preventable, and can be so prevented only by closely studying the cases before their fatal termination. There are, first, the deaths resulting from industrial accidents; second, there are deaths resulting from so-called occupational poisonings, of which lead poisoning, arsenic poisoning, mercurial poisoning are illustrations; third, there are the occupational infections such as anthrax tetanus and possibly hookworm among miners, and the occupational traumas due to extreme alteration of the physical conditions under which the normal physiological operations of the body are carried on—caisson disease being an illustration; and finally there are the deaths, perhaps most important of all, which result from conditions of a more diffuse character. In this last group the conditions resulting in death are general, complicated, and often insidious in character. The occupation in these cases aggravates the morbid conditions which commonly affect large numbers of the population.

Pulmonary tuberculosis may be taken as an illustration of this fourth group. This is an occupational disease, from this point of view, for quarymen, certain groups of the textile workers, garment workers and others.

The figures that are now available point out distinctly that these groups show higher mortality rates for the working periods of life than do corresponding age groups of all occupied persons of the same sex. On further analysis, the higher mortality can be traced to a higher incidence from pulmonary tuberculosis. This is so constant over long periods of time and in different countries that we cannot escape the conclusion that the particular kind of work done by these groups carries with it a higher incidence of tuberculosis.

What is thus indicated to be true of tuberculosis is probably true in varying degrees of a number of other diseases. Increased knowledge of our occupational stress on life and health is our chief desideratum at this time. We must have the facts with regard to occupational mortality and morbidity in this wider sense.

To obtain these facts the Committee recommends the intensive study of local problems in this field presented by the chief occupations of each community. The health departments, with their vital statistics and inspection equipment, in coöperation with other public and volunteer agencies have a great opportunity to do this. The living conditions, age, occupational environment, character of illnesses being treated by the local physicians, evidence of physical deterioration during service, mortality—all of these are factors requiring accurate tabulation and comparison. The full reporting of occupational data for all deaths needs constant emphasis. The practicability of collecting this information has

been demonstrated by such investigations as Doctor Schereschewsky's study of garment workers, Doctor Hayhurst's work with lead workers and potters in Chicago and Ohio, Doctor Goldwater's investigations of New York City employees and licensed peddlers, Doctor Hansen's work in Massachusetts, Doctor Sachs' work in Chicago, Doctor Tucker's work on cement workers, and the many other observations of workers in textile mills and various trades.

In addition to intensive studies in recognized industrial centers, there is need for state and municipal departments systematically tabulating the data relating to a selected group of diseases: for example, tuberculosis, chronic nephritis, organic heart disease and rheumatism. This information collected for all parts of the United States and preserved with the best obtainable occupation data would be a valuable aid in ultimately obtaining a series of death-rates for the important diseases in which occupation is a major factor.

The Committee has included for purposes of discussion two lists, one of occupations, the other of causes of death which it believes will be found useful in tabulating the statistics of occupational morbidity and mortality.

These lists have been developed and used by Dr. Louis I. Dublin in an extensive study of over 200,000 deaths. The Committee suggests that detailed analyses of the data for single occupations in the list be made in particular industrial centers. Thus, in Orange, N. J. and Danbury, Conn., an intensive investigation of the hatting indus-

try could be made. Trenton, N. J., could examine the pottery trades; Butte, Mont., copper mining; and, say, Lawrence, Mass., the cotton goods industry. Similar studies have been completed by the Medical Officer of Health in Blackburn, England, for the cotton spinning industries of that city, and by the municipal health office of Solingen, Germany, for the cutlery trades. The application of the facts derived from these studies in Europe should encourage similar statistical inquiries in the United States.

It is recommended that progress reports along these lines be published by the United States Public Health Service in its weekly *Reports*.

The Committee believes special efforts should be made to develop active coöperation between vital statisticians, health officers, labor commissioners and officers of compensation boards.

The importance of liberalizing our compensation laws by including occupational diseases should be emphasized. Hand in hand with this movement should go an endeavor to popularize forms of sickness-insurance in the several states as a wise method of distributing the costs involved in any scheme for extension of compensation laws.

The members of your Committee corresponded with investigators in this field, statisticians and others, and the Committee considered carefully the advisability of extending this report by including quotations and data from the correspondence and information collected. Since most of the important studies of occupation in

relation to morbidity and mortality have been published, and bibliographies exist, it seemed advisable to place before you only this series of suggestions for the development of future observations.

In recommending its discharge, the Committee suggests the inclusion of the study of occupational morbidity and mortality in the work of some standing committee of the Association, or the selection of the subject for a symposium of experts in the program of one of the sections.

DR. JOHN B. ANDREWS,
MRS. JOHN B. ANDREWS,
DR. LOUIS I. DUBLIN,
DR. JOHN W. TRASK,
DR. WILLIAM F. SNOW, *Chairman*.

LIST I.

METROPOLITAN LIFE INSURANCE COMPANY— STATISTICAL BUREAU.

Occupation Classification—Census, 1910.

I. AGRICULTURE, FORESTRY AND FISHERIES.

1. Farmers and farm laborers
2. Fishermen
3. Oystermen
4. Lumbermen and raftsmen

II. EXTRACTION OF MINERALS.

5. Coal miners—underground
6. Coal miners—other
7. Miners (other)—underground
8. Miners (other)—aboveground-placer, dredger and hydraulic mining
9. Oil well workers
10. Quarrymen

III. MANUFACTURES AND MECHANICAL INDUSTRIES.

(a) *Building Trades*.

11. Building laborers
12. Carpenters
13. House carpenters
14. Carpenters—other and unspecified

15. Lathers
16. Masons and bricklayers
17. Tilelayers
18. House painters
19. Painters and decorators—other and unspecified
20. Paperhangers
21. Plasterers
22. Plumbers, gas and steamfitters
23. Roofers
24. Structural iron workers

(b) *Chemicals and Allied Products.*

25. Chemical workers—unspecified
26. Explosive material workers
27. Lead smelters
28. Match factory workers
29. Paint and varnish workers
30. Zinc smelters

(c) *Clay, Glass and Stone Products.*

31. Brick, tile and terra cotta workers
32. Cement and lime workers
33. Glass workers
34. Marble and stone cutters
35. Pottery makers

(d) *Clothing Manufacture.*

36. Dressmakers and garment workers (at home)
37. Hatters and hat workers (wool and felt)
38. Milliners
39. Operatives in *tailor shops*
40. Operatives in *clothing factories*
41. Other clothing workers

(e) *Food and Kindred Products.*

42. Bakers
43. Confectioners and candy makers
44. Creamery workers
45. Food canners and preservers
46. Millers and flour workers
47. Sugar makers and refiners
48. Slaughter and packing house workers

(f) *Iron, Steel and Their Products.*

49. Blacksmiths
50. Boilermakers
51. Cutlers and grinders (iron and steel products only)
52. Iron and steel mill workers
53. Iron molders
54. Other iron foundrymen

55. Machinists and toolmakers
56. Polishers (iron and steel products only)

(g) *Leather and Its Finished Products.*

57. Shoemakers
58. Shoe factory operatives
59. Tannery workers
60. Saddle and harness makers
61. Other leather workers

(h) *Liquors and Beverages.*

62. Brewers and maltsters
63. Distillers and other liquor compounders

(i) *Lumber and Its Remanufacture.*

64. Cabinet and furniture makers
65. Coopers
66. Saw and planing mill workers
67. Pattern makers
68. Other wood workers
69. Wagon and carriage builders

(j) *Metals and Metal Products (except Iron and Steel).*

70. Brass molders
71. Other brass foundry workers
72. Brass and copper polishers and grinders
73. Other brass and copper workers
74. Gold and silver workers
75. Other metal workers

(k) *Paper and Paper Products.*

76. Paper and pulp mill workers
77. Workers in paper products (boxes, etc.)

(l) *Printing Trades.*

78. Compositors
79. Pressmen, press feeders and "printers"
80. Bookbinders
81. Electrotypers and stereotypers
82. Engravers

(m) *Textiles.*

83. Cotton, silk, woolen and linen mill workers
84. Rope, cordage and hemp mill workers
85. Other textile mill operatives
86. Dyers, bleachers and finishers

(n) *Miscellaneous Industries.*

87. Broom, brush and whisk makers
88. Button factory operatives
89. Caisson and tunnel construction workers
90. Cigar makers and tobacco workers
91. Electricians

- 92. Electric linemen
- 93. Electric battery makers
- 94. Furriers
- 95. Gas workers
- 96. Oil refiners
- 97. Rubber factory workers
- 98. Stationary engineers and firemen
- 99. Straw workers
- 100. Upholsterers
- 101. Mattress makers

IV. TRANSPORTATION.

(a) *Railroad.*

- 102. Steam railroad engineers
- 103. Steam railroad firemen
- 104. Steam railroad trainmen—freight traffic
- 105. Steam railroad trainmen—passenger traffic
- 106. Steam railroad dining car, cooks and waiters
- 107. Pullman porters
- 108. Steam railroad track and yard workers
- 109. Steam railroad station employees
- 110. Street railroad employees
- 111. Subway trainmen
- 112. Elevated trainmen

(b) *Water.*

- 113. Sailors and marine workers

(c) *Other Transportation.*

- 114. Longshoremen and stevedores
- 115. Teamsters and drivers
- 116. Chauffeurs

V. TRADE.

- 117. Agents and canvassers
- 118. Traveling salesmen
- 119. Hucksters and peddlers
- 120. Merchants and storekeepers
- 121. Store clerks and salesmen (small retail store)
- 122. Store clerks and salesmen (department store)

VI. PUBLIC SERVICE.

- 123. Firemen (city department)
- 124. Letter carriers
- 125. Policemen and detectives (city department)
- 126. Watchmen and guards
- 127. Seamen (navy)
- 128. Soldiers

VII. PROFESSIONAL SERVICE.

- 129. Actors and public entertainers
- 130. Teachers
- 131. Undertakers and embalmers
- 132. Other professional service

VIII. DOMESTIC AND PERSONAL SERVICE.

- 133. Barbers
- 134. Boarding and lodging house keepers
- 135. Hotel and restaurant keepers
- 136. Domestic servants
- 137. Laundry workers
- 138. Saloon keepers and bartenders
- 139. Saloon porters
- 140. Waiters
- 141. Hotel and restaurant cooks
- 142. Washerwomen

IX. OTHER OCCUPATIONS.

- 143. Bookkeepers and office assistants
- 144. Shipping and stock clerks
- 145. Children, students and scholars
- 146. Hostlers and stablemen
- 147. Housewives and housekeepers
- 148. Janitors, scrub women and building employees
- 149. Porters (unspecified)
- 150. Laborers (unspecified)
- 151. Retired (former occupation not stated)
- 152. Street and sewer cleaners
- 153. Telephone operators
- 154. Telegraph operators
- 155. Tinnners and tinware workers
- 156. All other occupations

LIST II.

CAUSE OF DEATH TITLES TO BE USED IN
OCCUPATIONAL MORTALITY TABULATIONS.

- Typhoid Fever (1)
- Influenza (10)
- Tuberculosis of Lungs (28, 29)
 - Tuberculosis of lungs (28)
 - Acute miliary tuberculosis (29)
- Cancer (39, 40, 41, 42, 43, 44, 45)
 - Cancer of the buccal cavity (39)
 - Cancer of the stomach, liver (40)
 - Cancer of the peritoneum, intestines, rectum (41)
 - Cancer of the female genital organs (42)
 - Cancer of the breast (43)

- Cancer of the skin (44)
- Cancer of other organs or of organs not specified (45)
- Acute Articular Rheumatism (47)
- Chronic Rheumatism and Gout (48)
- Diabetes (50)
- Alcoholism (56)
- Chronic Lead Poisoning (57)
- Other Occupational and Chronic Poisonings (58, 59)
 - Other chronic occupational poisonings (58)
 - Other chronic poisonings (59)
- Cerebral Hemorrhage, Apoplexy and Paralysis (64, 66)
 - Cerebral hemorrhage, apoplexy (64)
 - Paralysis without specified cause (66)
- Organic Diseases of the Heart (79)
- Bronchitis, Acute and Chronic (89, 90)
 - Acute bronchitis (89)
 - Chronic bronchitis (90)
- Pneumonia (92)
- Pleurisy (93)
- Cirrhosis of Liver (113, 113A)
 - Cirrhosis of the liver (113)
 - Alcoholic cirrhosis of the liver (113A)
- Bright's Disease (120)
- Suicide (155, 156, 157, 158, 159, 160, 161, 162, 163)
 - Suicide by poison (155)
 - Suicide by asphyxia (156)
 - Suicide by hanging or strangulation (157)
 - Suicide by drowning (158)
 - Suicide by firearms (159)
 - Suicide by cutting or piercing instruments (160)
 - Suicide by jumping from high places (161)
 - Suicide by crushing (162)
 - Other suicides (163)
- Poisonous Gases, Other Accidental Poisonings (165, 168)
 - Other acute poisonings (165)
 - Absorption of deleterious gases (conflagration excepted) (168)
- Other Accidental Violence (166, 167, 170, 171, 172, 173, 174, 175, 176, 185, 186)
 - Conflagration (166)
 - Burns (conflagration excepted) (167)
 - Traumatism by firearms (170)
 - Traumatism by cutting or piercing instruments (171)
 - Traumatism by fall (172)
 - Traumatism in mines and quarries (173)
 - Traumatism by machines (174)
 - Traumatism by other crushing (175)
 - Injuries by animals (176)
 - Fractures (cause not specified) (185)
 - Other external violence (186)
- All Other and Unknown Causes

A NEW SAMPLING APPARATUS FOR THE DETERMINATION OF AERIAL DUST.

GEORGE T. PALMER,

Chief of Investigating Staff, New York State Commission on Ventilation.

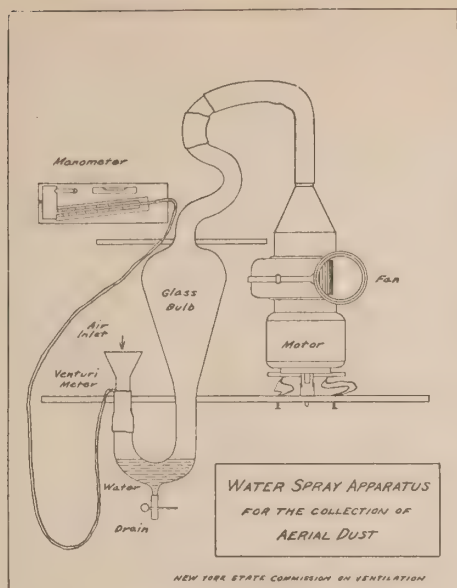
DURING the course of a study of dust-sampling methods by the staff of the New York State Commission on Ventilation, there has been developed a new apparatus for collecting dust from the air, the use of which appears to possess certain distinct advantages over the procedure ordinarily adopted.

The principle of this apparatus closely resembles that of the commercial air washer.

This device, illustrated in the accompanying drawing, consists of a glass bulb with tubular elongations at each end. The lower tube is U-shaped and in its lower part or trap are placed

about 40 cc. of distilled water. As air is exhausted by means of a No. 00 Sirocco blower from the upper end of the bulb, the water is displaced from the U tube and on reaching the bulb enlargement it breaks into a fine shower. The force of the air stream keeps the water in constant spray formation and the air itself is washed of its suspended dust as it passes through this water shower.

The air is measured by means of a special venturi meter constructed by Wallace and Tiernan of New York City, which is placed over the inlet of the U stem. The manometer is calibrated in cubic feet per minute.



The procedure followed to best advantage is to fill the U stem with about 40 cc. of water. Against this water column the pump delivers from three to four cubic feet of air per minute.

Evaporation extracts ordinarily about $\frac{2}{3}$ cc. of water per minute varying of course with the temperature and humidity of the air, and this loss must be made up at frequent intervals to maintain the efficiency of the washing process and to keep the air flow constant. After a run is completed, the water is decanted and the glass bulb rinsed with water making the total volume of the sample up to about 100 cc.

The dust content of the sample thus secured may then be estimated either by reading its turbidity against a set of standards, by counting the dust particles in a portion of the sample under the microscope or by weighing the solids after filtration through a Gooch crucible or after evaporation to dryness.

The compactness of this sampler is suggested in the photograph, the entire equipment being mounted in an ordinary suitcase, the whole weighing 17 pounds. This weight could be materially reduced by using an aluminum casing for the motor in place of the iron casing shown.

It should be particularly noted that this washing principle differs from the bubbling of air through water, a process which creates consid-

erable resistance to the pump and which if operated at any but a low rate permits large bubbles of air to pass through the water without assurance of separating dust particles from the center of the bubble. The air washer provides a far more intimate contact between air and water.

The possibility of drops of water being carried out of the bulb is prevented by the irregularly shaped neck. Water has never been observed to spatter beyond the first bend.

When the water becomes very turbid there is some likelihood that isolated drops may evaporate and leave a deposit of solids on the glass. Such dried matter can be removed by thorough rinsing but it is simpler to terminate the sample when a turbidity of 1,000 is exceeded.

The general efficiency of this washing method appears to be about the same as that of the ordinary sugar filter. In a comparative study of about 130 different samples of air (which will later be fully reported by L. V. Coleman, H. C. Ward and the writer), the washer method gave counts on the average about 90 per cent. of those obtained by the use of the sugar filter.

It is felt, however, that the actual difference between the two methods of sampling is even less than is suggested by the comparative counts. This conclusion is based on the finding that in the same environment, within certain limitations, the smaller the air volume sampled the larger is the resultant count per cubic foot. This is explained by the presence of an appreciable constant error incident to counting which is relatively great with small air samples and relatively slight in large volumes. With the sugar filter the average air sample was five cubic feet whereas with the spray apparatus the average air volume sampled amounted to 32 cubic feet.

On the other hand the great advantage of the new procedure is that it makes it possible to collect large volumes of air and this permits the estimation of the dust by weighing as well as by counting. The sugar filter requires nearly seven hours to filter 100 cubic feet of air, an amount necessary for weighing purposes unless the air is very dusty. The air washer passes this amount of air in about 30 minutes. This difference is due not to the greater power of the pump but to the fact that the water filter offers so much less resistance to the air stream than the dry filter pads of sugar, paper or cloth.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE regular quarterly meeting of the Massachusetts Association of Boards of Health was held at the Brunswick Hotel, Boylston street, Boston, Thursday, October 28. Dr. Milton J. Rosenau presided.

The following were elected to membership: William Eustis Brown, instructor School for Health Officers, Harvard, M. I. T., Cambridge; Albert M. Goulding, Millbrook, Mass., Chairman of the Duxbury Board of Health; Samuel Miller, Inspector, Board of Health, Malden, Mass.; John W. M. Bunker, Director Bacteriological Department, Digestive Ferments Co., Detroit, Mich.

REPORT OF COMMITTEE ON INCORRIGIBLE CONSUMPTIVES.

MR. SEYMOUR H. STONE: Mr. President, for the purpose of making this report the committee sent out a letter to secure certain facts. As it seemed desirable to make the letter as brief as possible, it contained only three questions:

(1) What is the number of incorrigible consumptives in your community who should be isolated, by force if necessary, in order to protect the community?

(2) Give an account of such cases as are a menace, laying special emphasis on how they refuse to take the necessary precautions.

(3) How do you think this problem should be solved?

The committee sent out 375 letters, 307 to members of this Association,

and the remainder to the anti-tuberculosis associations in the state, the state health officers, the trustees of hospitals for consumptives, the members of the State Department of Health, eighteen superintendents of tuberculosis hospitals, and twenty boards of health that are not represented in the membership of this Association. To these 375 letters we have received the enormous number of 44 answers from 34 different cities and towns! These replies gave a total of 90 incorrigible consumptives. Sixteen of the 34 cities and towns stated that they had no incorrigible cases. From the nature of the replies, however, there is some doubt as to whether all of the 90 reported incorrigible cases are actually incorrigible. The evidence submitted was, in many instances, insufficient. A number of the replies simply stated that they knew of two, or three, or half a dozen incorrigible cases, without showing why these cases were considered incorrigible.

Of course this brings up the question as to what an incorrigible case is, and I think I am correct in saying that the committee would define it as one who has tubercle bacilli in his sputum and is not taking the necessary precautions, thus rendering himself a menace to the community. Without evidence to this effect, I believe the committee would not feel that a case should be considered incorrigible.

I want to say in this connection that the committee does not like the phrase *incorrigible patients* or *incorrigible con-*

sumptives, believing it to be too harsh a term. In many instances the offending patient may eventually be corrected, and is therefore not properly described by the term "incurable," which implies a hopeless condition.

The committee is unanimous on the following points:

1. That it is necessary to provide an institution for the care and treatment of incurable tuberculous patients.

2. That a law should be passed relative to the removal of incurable consumptives to a proper institution. I believe Connecticut, New York and New Jersey have such a law. In Connecticut and New York I understand this law has been tested; but we fail to find any evidence of its having been tried in New Jersey.

To cover the first point the committee unanimously recommends the following bill:

An Act to provide for the care and treatment of incurable tuberculous patients.

Be it enacted, as follows:

Section 1. The Trustees of Hospitals for Consumptives, subject to the approval of the governor, are hereby authorized to take in the name and for the use of the commonwealth, land in fee by right of eminent domain or to purchase the same, and to erect and maintain thereon a hospital or hospitals for the custody, care and treatment of incurable and careless tuberculous patients, and for this purpose may expend a sum not exceeding dollars.-

Section 2. Within sixty days after any land is taken under the provisions of this act the said trustees shall file

and cause to be recorded in the registry of deeds for the county in which such land is situated a description thereof, sufficiently accurate for its identification, together with a statement of the purpose for which the same is taken, which description shall be signed by a majority of said trustees.

Section 3. This act shall take effect upon its passage.

To cover the second point, the committee unanimously recommends the following bill, which, I should add, is incomplete:

An Act relative to the removal of certain persons infected with tuberculosis.

Be it enacted, etc.:

Whenever it shall appear to the State Department of Health or to a local board of health that, by reason of improper care, improper household conditions or improper habits, the condition of a person suffering from tuberculosis is such as to endanger such person or his family or the public, and that the conduct of such person with regard to his health is not governed in accordance with the advice of a person competent to advise with regard thereto, such board of health may request the justice of the police, municipal or district court having jurisdiction in the district wherein such person resides to order his removal either to some proper institution for the care of tuberculous patients in the locality in which the patient resides, or to some institution maintained by the state, and such person shall remain in such institution until discharged by the authorities in charge thereof: provided, however, that, whenever the patient

shall so request, the authorities in charge of said institution shall notify the justice of the court which has taken original cognizance of the case of the desire of such person to be discharged, and thereupon, after hearing, the court may order such discharge or take such action with regard thereto as may be deemed expedient. Any authority in charge of such institution shall, upon failure to communicate the request of a patient as herein provided, be deemed in contempt of the court having jurisdiction of the matter.

The Board of Health of Northampton sent in a valuable suggestion, one or two points of which the committee feel might well be incorporated in the bill submitted.

The committee further recommends that provision be made in this act that a magistrate shall order such patients as are committed, if able, to pay their board; also that the act include a clause for the removal of incorrigible or unruly patients upon complaint of a superintendent of a public hospital or sanitarium.

The committee has not completed the draft of this act, because it wishes to submit it for the consideration and criticism of the Association. If the principles in this proposed bill are approved by the Association, the committee recommends that the whole matter be referred to a committee to perfect a draft, and that such a committee be authorized to add to its number and to present the bill to the legislature. Furthermore, the question comes up as to just how this bill, if approved, shall be presented to the legislature. In whose name shall it

be presented?—as a bill coming from this Association or from individuals? The committee would, I think, be pleased to have these bills printed, if it is decided to recommend them, for distribution among the members.

Discussion.

MAYOR CHARLES H. ADAMS, *Melrose, Mass.*: Mr. Chairman, for the purpose of starting some discussion, let me say that I am a member of the State Board of Charity and have had something to do with state institutions. Personally I am very much in doubt about the wisdom of legislation, seeking to put into hospitals by law or under sentence of the court these sick persons. I have no confidence that such legislation could be passed, and I think that there is a vast amount of work to be done on those who are ready to go to institutions before you start on the person who is determined not to go. All our institutions are more than filled, have long waiting lists I have no doubt, and the people who want to go to those institutions ought to have the first opportunity to enter them. I think that there is a much wider and better field of work in behalf of the cure of these people than by trying to use the machinery of the law and the courts to take care of these few incorrigibles, who perhaps are not entitled to the care of the institutions that have been put up for them.

DOCTOR COOLIDGE: With reference to "the few cases" of which Mr. Adams has just spoken, I should like to say that they are not a few, they are many. There have been cases enough reported from these thirty odd letters to fill a good-sized institution. There are many, and I am very much surprised that the members of this Association did not respond more freely and more in detail to the letter of our committee. At the tuberculosis conference at Springfield last week almost every member of a municipal board of health whom I met came to me with both hands up and said, "Doctor, you are sending them home. What are we going to do with them?" Members from Fall River, New Bedford, Lowell, Lawrence, I think three or four other cities, spoke to me in that way. We

ought to hear from those people. There are many cases, not a few.

Then in regard to who is going to back this bill. It seems to me that we are sure to fail if it goes in as a bill presented by a few individuals. This Association of Boards of Health, with the coöperation of the State Department of Health, it seems to me can have almost anything that it will ask for unanimously. If we don't ask for it as an Association I don't see very much chance of having the legislation passed.

DR. FRANCIS G. CURTIS: Mr. Chairman, it seems to me that Mr. Adams missed the point. The question is not the good of the incorrigible, but the good of the community in which the incorrigible lives. One incorrigible does more harm, it seems to me, than half a dozen men who want to go to a sanitarium, because they are willing to obey rules.

As to the point that Doctor Coolidge raises, about sending them out, that is one that we are all up against, as they say. When the state sanitarium is unable to take care of a man that it has got under its control it sends him out and turns him over to the local board of health, which cannot do anything with him at all; they can even do less than the sanitarium. It seems to me a very important question. These men won't do anything, and you cannot make them do anything under the present laws, and I think that some such law as this committee suggests is one that ought to be passed.

THE PRESIDENT: If we tried to reduce the thing to figures I suppose we could estimate something like this: that if each case of pulmonary tuberculosis is responsible for say four other cases on the average, which I think is a fair statement, then an incorrigible consumptive would be responsible, of course, for more than that, on account of the conditions; and if there are a hundred incorrigible consumptives in the commonwealth, and that is a very conservative figure, that would mean a minimum of four or five hundred unnecessary cases of tuberculosis contracted each year from the incorrigible consumptive alone. So we could reason along such lines as a mathematical basis on which to formulate some judgment.

DOCTOR THOMPSON: I think one trouble that local boards of health are confronted with is the fact that the policy of the State Board of Charity is not to compel their patients to return to Tewksbury when they go away, so that we are immediately told, if it is the policy of local boards to send incorrigibles or others back, that the State Board of Charity does not do it. I think as long as that is the policy of the state board it is rather idle for local boards to try to do very much. The opinion of the city solicitors also differs in different municipalities. The city solicitor of Fitchburg has given his opinion that we have authority to send our incorrigibles, or those that we think are a menace to the community, to the hospital, and we have done it in two or three cases; but the public sentiment is hardly up to that when we are confronted with the statement that the State Board of Charity does not do it.*

MR. STONE: I should like to call attention to the fact that if these proposed bills are to be presented to the legislature action should be taken now. The next meeting of this Association, I believe, comes after the time limit for the presentation of bills to the legislature.

It was unanimously voted to accept the report, which signifies accepting its general tenor, and to give the committee power to enlarge its numbers and authority to introduce these bills as bills of the Association.

The following were elected a nominating committee to present a report at the next meeting: Mr. Coffey of Worcester, Mr. Newcomb of Salem, Mr. Bates of Lowell.

COMMITTEE ON STANDARDIZATION OF LOCAL HEALTH REGULATIONS.

Mr. R. W. Hoyt, the chairman of the committee on Standardization of Local Health Regulations, stated that

* An agent of the State Board of Charities has told me since I made the above statement, that the State Board would be glad to compel state patients to go to Tewksbury but has no authority to do so, no law under which it can act.

the committee is hard at work but finds its problem too big to be completed at the time of this meeting.

The following program of questions and answers was then presented:

Question 1. What are the present defects in the executive and financial status of Boards of Health of large towns of Massachusetts?

MR. E. A. INGHAM: Mr. President, Members of the Massachusetts Association of Boards of Health: It would be presumptuous for me to attempt to answer in a nutshell so large and important a question as that which has been assigned to me. None of you, with more experience and more gray hairs than I possess, would care to attempt it. I have been fortunate, however, in having an unusual opportunity for the study of the question which I am to discuss.

In the summer of 1914 the Sanitary Research Laboratory of the Massachusetts Institute of Technology launched a study of the health work in the seventy-six Massachusetts towns having an estimated population of more than five thousand inhabitants. They should not be confused with the cities, which were not investigated. I was assigned to this work and have continued in it since that time, visiting each town either in person or by an assistant and collecting and compiling a large amount of data which is too extensive to be presented here, but upon which I should be glad to present a report to the Association later. The data comprise vital statistics, statistics of finances, of form of organization, of

methods of administration, and of sanitary conditions.

Coming immediately to our question, however, let us see what the executive status of the boards of health in our larger towns is. The law states that "a town may elect a board of health" but if it fails to do so "the selectmen shall act as a board of health." Of the 76 towns studied, 66 had elected boards of health, while 10, varying in size from Brookline with 30,000 inhabitants (the estimated population in 1913) to South Hadley with 5,004, entrusted their health administration to the selectmen. It is hardly necessary to say that in the majority of these ten towns the health work was sadly neglected. I may add that in each town where I interviewed a selectman on a board serving as a board of health I found an opinion similar to that expressed by a selectman of the town of A who said "Why does not the town elect a board of health instead of making us do the dirty work? We don't want to do health work and we don't know how if we did want to."

Is it not a distinct defect in the health work of a town to have such a condition existing?

If a board of health is elected the law provides that in towns over 5,000 "at least one member of the board shall be a physician." Who are the other members? Among the 198 members in 66 towns which have true boards of health 88 are physicians, 45 per cent., an excellent showing. Who do you think rank next? Plumbers. And next? Undertakers. In the town of B I found a board composed

of a doctor and two undertakers, and the undertakers did most of the work. I asked one of them if it was not likely to hurt his business, and he replied that he "hadn't noticed it much." Ranking after the undertakers in number come veterinarians, merchants, industrial workers, lawyers, and politicians or chronic office-holders, men whose occupation I could find as nothing except that they had always been holding some town office. We even find one each of janitors, the janitor of the town hall in one case serving as a member of the board of health, stable keepers, and milk dealers.

This is not a criticism, but is meant to show that the town boards must do with the best material available, trained in public health work or not.

Lack of interest on the part of the board is often a serious drawback to health work. A doctor, secretary and ex-officio agent of the board of health of the town of C, said to me: "I don't care anything about public health work but when I came to town the other doctors told me that I had to serve my term at it as they had done." I may add, to his credit, that he was doing the work conscientiously, but manifestly without enthusiasm or especial fitness. Another member of a board of health explained to me that his church did not believe in disease or germs as a cause of disease. Consequently he was inclined to neglect that phase of the work although he was interested and active in clean-up work.

Business may interfere with the efficiency of these poorly paid servants

of the public. I find that the salaries range in general from nothing to \$100 per year for the members of the board of health. The secretary and agent of one of the best town boards of health in the state is a practicing physician and has only four hours a day to spend on the health work of a town with a population of nearly ten thousand. Other physicians are deterred from really active health work by the jealousy of their fellow practitioners, or by the feeling that their fellow practitioners may become jealous if they become too vigorous and go around, making a point of making friends with the people.

In the town of D the secretary of the board of health is in the real estate business, and in reply to my question as to what he did about nuisances said: "I don't do anything much. I have been trying to get off of this board for six years but they keep electing me. If I go out and make trouble about a nuisance I may make an enemy of a possible customer. I can't afford to spoil my own business for fifty dollars a year that the town pays me." A local man in business is almost always handicapped by his associations.

In 62 towns of the 76, the board of health does its own work or has part-time employees. Fourteen towns employ one or more men who devote their entire time to some phase or phases of health work. Is there not enough work in a town of five thousand or fifteen thousand to keep one man busy all day? Without doubt there is, but the town of E says in its annual report: "Among the many departments entrusted to the care of the board of

health may be mentioned Infectious Diseases, Placarding Houses, Fumigating, Garbage Collection, Milk Production and Distribution, Inspection of Meat and Provisions, Sanitary Housing of Swine, Regulation of Stables, Sanitary Disposal of all Waste and Refuse, Plumbing Inspection" and so on. It takes a many-sided man to carry on or oversee all of this work efficiently, and in many cases the agent of the board is chosen on account of his ability as plumbing inspector instead of on account of a knowledge of up-to-date health work. The fact remains that a good trained health officer can keep busy in a town of five thousand on purely health work.

An office and a telephone with a regular attendant should be maintained by the board of health in every large town, so that reports of disease may be promptly received. The office and telephone attendant may be maintained in connection with some other department of the town, but the telephone should be listed in the name of the board of health. A man with special training in contagious disease work (if a doctor is not a possibility) should visit every case of disease within four hours after it is reported. Plumbing inspection may be done by some other employee of the town, but the board of health must care for contagious disease promptly and a full-time man is a necessity in a large town. I may note a case where the health officer was also inspector of slaughtering. He would go out and stand all day watching slaughtering at a slaughter house in an out-of-the-way section of the town and could not attend to

reports of contagious diseases that came in during that day.

Must the board of health do all the work which was referred to in the report of the town of E? Is plumbing inspection, refuse disposal, and garbage collection a function of the health board? Most of us will answer no, although it should perhaps have some oversight of the methods used. The annual reports of a large number of boards consist of a statement of the letting of the contract for the collection of garbage, the number of nuisance and plumbing inspections and the number of cases of communicable disease. How long must health boards carry the burden of such work as plumbing inspection and refuse disposal, which belongs to other departments?

Many health boards devote most of their attention to these matters because it has always been the custom. They lack the theoretical knowledge and the broad point of view which will show them that controlling the milk supply is worth more to health than is plumbing inspection and the condemning of all foods which do not come up to a certain chemical standard of purity; that prevention of disease by education and inspection is more desirable than quarantining cases after they have occurred. I don't object to the quarantining of cases, but it is better to prevent them.

Illustrating the financial status I could show you many diagrams showing various phases of the subject. Briefly we may sum this up as follows: the gross expenditure by boards of health in the 76 towns studied varies

from \$2.50 per capita per annum in Brookline to \$0.021 in Monson, the majority spending between ten and forty cents per capita. Investigation of the Brookline statistics, as furnished by the town accountant and the State Bureau of Statistics, shows that over \$39,000 of the health expenditure is for the collection of garbage, ashes and rubbish. A revision of the health schedule omitting garbage collection and plumbing inspection shows per capita expenditures varying between \$0.02 and \$1.06; only two being over \$0.50 and the majority less than \$0.20.

Not only are these amounts small as compared with the amount spent for health in our more progressive communities, especially our cities, but also they are small compared with the amounts spent by the towns on other departmental activities as distinguished from outlay and interest on bonds. The health expenditure will be found to be about one per cent. of the total expenditure by the town on the maintenance of departmental activities. The expenditure on the care of the trees is almost universally much larger than that on the care of the health of the people. A certain state official to whom I mentioned this fact said: "Why, of course. The care of the trees is more vital." Fire, police, water, streets, and education all receive many times the amount allotted to health. This is, of course, necessary and desirable, but the difference is more than it should be.

Why is a town willing to increase its appropriation for streets, for education, for anything rather than for

health? First and by all odds most important is the fact that in everything but health work additional expenditure brings visible results. Second, the small size of the true health expenditure is marked by the expenses for garbage collection, plumbing inspection, and settlement cases. May we not conquer this second evil first and then when we get an increased appropriation *get some results* that will stand out. The town of F spends more on health than any other town investigated with one exception, yet its death-rate and infant mortality rate are the highest of any. Can you blame the town of G if it says: "We don't want to increase our health expenditure. Look what happened to F."

Recently a health officer applied for and got a position with the understanding that he was to have an adequate sum for expenses and if he failed to reduce the death-rate in the first year of his work he would accept no salary. It takes a man of ability, broad knowledge, and specialized training to put such a proposition through. Can we expect an increase in expenditure on health to bring results in the town of H, where the physician of the board told me that an epidemic of diphtheria in a school was due to the dumping of paper and ashes on a nearby lot, and that the growth of duckweed in a stream in the town would probably cause an outbreak of typhoid or diphtheria soon unless the town gave him money to have it cleaned up? He was a conscientious old doctor, but he did not have sanitary training in

the days when he was in medical school.

In several towns I have been asked: "Why doesn't the State Board come in and tell us what to do? They only come after the epidemic has broken out." This investigation was made two years ago. I won't say anything about the State Department at present; I use the term Board instead of Department. "If they would come in and tell us what we *ought* to do from day to day we are willing to do it, but we *don't know* these things."

May I sum up briefly some of the most prominent defects in the executive and financial status of the boards of health of our larger towns, as I have tried to show them?

EXECUTIVE.

1. Lack of active and interested members of the boards. Boards of selectmen are inadequate. They should not be obliged to take this up.

2. Lack of full-time employees.

3. Lack of men trained in public health work who can serve on boards or as agents of boards and use perspective in the direction of health activities.

4. The burden of duties not immediately affecting health; plumbing inspection, etc.

5. Failure to emphasize popular education and to awaken the interest and coöperation of the town.

I have found several towns which were spending considerable sums of money on the suppression of mosquitoes. There was over one thousand dollars in some cases, in others over two thousand dollars. I looked up

the reports of those boards of health and found no cases of malaria reported to the State Board of Health in several years past, before they started their mosquito work. Every one admits that mosquitoes are a nuisance, but should the board of health spend such a large proportion of its money on the suppression of mosquitoes if there is no malaria? If there is malaria, and it is not reported, perhaps it would be better to divert some of the money to the reporting of vital statistics rather than to the suppression of mosquitoes, and get a fair idea of what there is.

FINANCIAL.

1. Lack of adequate appropriations and failure to spend efficiently the amounts received.

2. The necessity of burdening the health account with non-sanitary expenditures.

3. The curse of "settlement cases" which must be approved by the board of health but should not be paid from its appropriation.

I found that all over the state the towns were complaining because they had this trouble with their settlement cases. Whether their fears and difficulties were well founded or not I do not know, but I found that it was the universal opinion that they were handicapped by the matter of settlement cases. And finally,

4. Failure to pay salaries which will command the services of experts.

Of course there is also the difficulty of finding the proper men.

I would submit these remarks to the Association with due modesty, and

shall be most pleased to receive criticism upon them, because I realize my own inability to talk to men, to instruct men older than I am; but having made this study of the work I have become very strongly impressed with these defects which I have mentioned.

MR. W. E. BROWN, C. P. H., of *York, Me.*: Mr. Chairman, Members of the Association: In introducing this discussion I wish to state that my paper is complementary to the paper of Mr. Ingham. I hope to discuss a little more in detail some of the facts which he has brought out and suggest ways and means of remedying the same.

One of the acknowledged weaknesses of our American system of municipal government and administration is the glaring lack of efficiency and the failure to show adequate results for the investment of public funds. These defects in our municipal administration may be traced in part to two causes: first, the leak due to gross misuse of public funds, which may enrich the individual but not the community, and secondly, the failure to conduct municipal affairs along the lines of business efficiency. Instead of being the exception to this rule, the health departments of most cities are shining examples of failures to produce results. However, the entire blame for this latter condition is not always attributable to the health department. The difficulty in the matter very often lies in the fact that the health department is unable to perfect any effective organization because of lack of funds and because of inability to organize

properly. The trend of the times nowadays is to demand that some results be shown for the investment of money, and it is of interest to those of us who are engaged in public health work to define ways and means whereby we may show results for the money which is committed to our trust. Before we can ask for more funds we must prove to the community in which we work that we are making use of the money which is entrusted to us. The question of importance, then, is: how may we remedy the present defects in our municipal health administration?

In the first place, every effort should be made to secure a board, an administrative board, whose sole function is that of health administration. We should not wish upon the board of selectmen the job of looking after the health interests of the community. In many instances the members of such boards neither have time, inclination nor training for doing the work, and if they attempt anything it is done in a sort of perfunctory manner. Men should be chosen on the health board, who are qualified both from previous experience (preferably from previous training) and from interest in the work. I want to lay especial emphasis upon the last mentioned. If a man who is occupying a position in one of our administrative health boards has not the public health point of view, has not interest in the public welfare, he is in the wrong place. It does not mean that a man must be a trained physician, nor must he have had training in the health school, in order to act in this capacity,

but he must have interest in the work, so that he will make up in studying the problem and in getting the public health point of view what he lacks in the training itself.

In the selection of a board it is most important that a man's professional qualification should be taken into account. It is important to see that he is a man who has no affiliations, which will hinder him from carrying out the work of the department. Mr. Ingham pointed out one or two cases where men, because of their business affiliations, were unable to carry out the work. A striking case of that is the appointment of a milk producer on the board of health. While he may understand thoroughly the milk business, yet he is inclined to take the individualistic point of view, and may not be free to act when it comes to the question of the proper handling of the milk supply.

Where it is possible amongst the employees of the health department, full-time men should be given the preference. We appreciate the fact that there are some communities which are not large enough to have full-time men, but in many of those cases it is possible to combine the duties of several officers under the health department and have one man, who is qualified to handle them all.

A definite study should be made at the beginning of each year as to the policy and as to the line of work which is to be carried on by health departments. Care must be exercised to see that the major portion of the funds of the health department

are not devoted to lines of work and activities which are not primarily health problems. As has already been called to our attention, many communities are now devoting the greater part of their funds to the collection and disposal of garbage and the removal of refuse, while actual health work comes in for a very small part of the time and attention of the health authorities. Because of the fact that the funds are thus used, little or no attention is given to educational work, which we now feel to be one of the most important branches of the work.

The health work in our communities cannot go ahead faster than the knowledge of the people will permit. It is important that we have the people work intelligently with us, and in order to bring about that state it is necessary that they be educated. The study of town budgets and expenditures has shown quite conclusively that towns as a rule consider the work of the board of health as one of the least important. Possibly we may attribute this fact to the past administrations of the funds which have been entrusted to the health departments. Possibly it is due to the fact that it is more difficult for the health department to show results than it is for other departments. For instance, the fire department has a much more picturesque method, when it comes to showing that it is producing results. The presence of the policeman on the street shows that the police department is actually doing work. When it comes to the question of the health department it is very difficult to show

that results are being accomplished. Our health departments must follow the suit of these various departments and devise some means to show results. By that I do not mean that they shall necessarily simply go through the motions, but they must make a study of ways and means of placing themselves before the community in a progressive manner.

The department should not be concerned chiefly with emergencies. It seems to me that is a mistaken conception which people have of the activities of the health department. They feel that it is all right to have a health department which lies idle during the year, except at times of outbreaks. This is entirely wrong, but I am sorry to say that the appropriations, which are made for most of our health departments, are made on this basis. Part-time departments, which are put on the shelf for part of the year, receive appropriations in accordance with the idea which people have of their work. It is up to those of us who are in the health work and who are interested in health activities, to show the community that we are on the job all of the time, and that prevention is more important than the cure, which we may have to apply in cases of emergency.

Thus far we have dealt on ideals. Now the important question is one of accomplishment. How can communities which have limited appropriations hope to accomplish this sort of work?

In the first place, it cannot be done in a single year, nor can it be done under a single board. It is a slow

process, and one which must have time and energy devoted to it. However, there are certain fundamental principles which seem to me to be effective in making a start. In the first place, the small amounts which are now appropriated for our health work must be used to the best advantage. The first important step is to see that a well qualified man is procured to act as the agent of the board. This requires that a community have a full-time health officer, who has had previous experience and who has had sufficient training to take charge of the health activities of the town. By securing this full-time health man, who may take the various duties of the health department and, in smaller towns do all the work of the health department, possibly a little more expense may be involved, but in many instances money will be saved. His office should be entirely free from political interference, and he should be at the disposal of the community to do educational work. He should make a point of applying the most modern business methods to the work of the department and should pursue policies of real economy. In some instances, where we have smaller communities which cannot afford to have this full-time health officer, it may be advisable to pursue the policy of coöperation with other communities, and thus secure the full-time service of an expert for the various communities combined.

In these various ways which I have briefly outlined, better work can be done, more telling results can be pro-

duced, and the public will be able to see that the health department is filling a place of importance in the community life. The end result of the same should be more money appropriated and a broader scope of work for the health department. Until we learn to use to the best advantage the money which is given to us we can hardly ask for more.

Discussion.

MR. R. M. HOYT: Mr. Chairman, I am interested in these papers, because they are along the line of my own professional problem as the health officer of a group of towns, five of which are in the class of over five thousand population. Of the practical methods of trying to secure a larger and more adequate appropriation, one method which has seemed in our practice to be of the greatest use has been a budget exhibit. Most towns have a finance committee, or a committee that performs that duty, and the membership changes from year to year. The members of the committee or sub-committee on health appropriations have very little idea, not only of the health appropriation, but of the expenditures of the town itself. They are simply given this honorary duty, without any great interest, without exerting any great energy, without informing themselves very thoroughly as to town expenditures, and generally the members of the town finance committee are the most surprised members of the whole community to find out how the community is spending its money. I remember how at some of our exhibits the committee was so amused that it simply broke into laughter at the very obvious inequalities in the expenditures of the town, from the fact that many towns spend more than twice for the laying of the dust in the streets what they do for all purposes with which the board of health has any connection whatsoever, including the medical inspection of school children, and the collection of garbage, and the inspection of plumbing, and everything else to be named. In one town, quite a wealthy town, the interesting comparison was made that the salary of the high school janitor was more

than the salary of all the employees of the board of health, the maintenance of the office and laboratory and the up-keep of the conveyances. That one simple comparison did a great deal more than columns of vital statistics. It was talking in the language that the men talked in who were members of this finance committee, whose word meant so much to the voters of the town. I think there are few things which will help the board of health to secure an adequate appropriation which are of any more practical value than the simple kindergarten budget exhibit.

COMMISSIONER A. J. McLAUGHLIN: It has been a great pleasure to listen to the scholarly paper of Professor Ingham and the practical common sense expressed by the health officer from York, Me. I think there is no subject of health work that requires such careful study as the proper adjustment of the expenditures which are charged to health. I know that it is unfair to any health department to have to shoulder the responsibility for the expenditures which are charged to it. I notice in the editorial column of one of our daily papers the startling fact that the State Department of Health was now spending \$535,000 a year, whereas in 1910, or before, it was spending something like \$200,000. As a matter of fact, I happen to know that of that \$535,000, \$130,000 is spent by the Bureau of Animal Industry and \$150,000 more is paid for compensation for cattle slaughtered during the foot and mouth disease, all of which the poor Department of Health has to shoulder as part of its expenditures.

Now, I know that in practically all communities all the things that have been said by the gentlemen who have preceded me are true: that there is a gross misappropriation of public funds under the name of public health, and that before we can ask for more money we want to be sure that the money which is alleged to be spent for public health is really spent for public health.

There is one other thing that appeals to me strongly and is brought out very well in these papers, and that is the system by which small towns, which of themselves are unable to pay for adequate officers, may, by coöperation, secure them, and I think it is a point that ought to be studied very carefully. And in this con-

nection it may also be applied to laboratories. There is a great need in the state for laboratory facilities in the towns, without having to send into the State Department of Health or into the nearest city. I know that the State Department of Health now is doing far too much routine work, and, gentlemen, I feel that it is doing no kindness to any community to do its work for it. I feel that the State Department of Health ought to attempt to raise the efficiency of the local health departments, and it is not doing this by doing laboratory work for the large city or town. I believe that by a coöperative principle four or five of these small towns could combine very well, as has been done in some notable instances, and have a private laboratory to supply that group, and in that way relieve the stress upon the State Department of Health, which is becoming greater every day, and which in my opinion should become less. I think that the State Department of Health should do less and less the routine examinations of typhoid and other contagious disease specimens.

DR. FRANCIS G. CURTIS: Mr. Chairman, there is one thing about public health work that I think handicaps the department in getting its money, that is; that most communities don't know they have a board of health until it breaks down. If it is doing good work in the prevention of disease, they don't know it exists, but when an outbreak comes and the board, as they say, gets busy, then they are aware of its existence. Consequently when you go to your finance committee and ask for money you really have the best argument to go and say: "We had a lot of disease last year, and we may have a lot this year," and you are more apt to get it. At least, that is my experience.

THE PRESIDENT: It seems to me one of the brightest features of the situation in public health administration is the fact that we have able, energetic and capable young men, such as the two who have read the papers under this topic; men who are skilled in the sanitary sciences underlying health administration and fully understand the economics of sanitary administration. That in itself is a feature which will, I imagine, in time help to solve some of the difficulties under which we labor.

Question 2. What is Meant by "Septic Sore Throat"?

DR. EUGENE R. KELLEY, *Boston, Mass.*: I might say at first that I would like to have it distinctly understood that this subject is none of my choosing and was wished on me. In the second place, I will say that to ask what is meant by septic sore throat reminds me a good deal of the old conundrum that our biology professor used to put up to us: Why is a snake? One is about as easy to answer as the other.

Under the list of reportable diseases in this state is included septic sore throat. I have frequently wished that it had not been included in that list of diseases, because about every day somebody comes up to bother me regarding what we are going to rule as to septic sore throat. Practically speaking, the most satisfactory basis that we can have for a disease definition is to get it tied down to a concrete pathological or bacteriological basis. If you can do either one or the other you can define the disease fairly well. If you try to define septic sore throat by following an exact bacteriological basis you are led into a deep morass. You would have to include the finding of practically any organization of the streptococcus type in anybody's throat, and that is going altogether too far. That would not only include practically every case of ordinary follicular tonsillitis, but it would include the results from a good many supposedly normal throats. So it certainly will not do to use that as a basis for definition as to what we mean by septic sore throat,

and for that very reason, as I say, I rather doubt the wisdom of having made this disease reportable.

On the other hand, we have made it reportable, and now the question comes up, is it wise to repeal it? All things being considered, it seems as if it would be rather less wise to repeal it than to keep it. The exact technical definition may sound impossible, yet I think for practical purposes we can figure out a working compromise that will make this disease entity appear to be something tangible and sensible. This will really benefit the cause of public health if we follow along those lines and have a clear understanding of what we mean.

I have collected and culled and sorted from various authorities some of the thoughts that have been scattered through their writings on the subject of septic sore throat. I think, perhaps, I can do no better than to give you the advantage of a few of them. I think you will have a clearer idea than I have as to just what they all lead to when I get through.

It is defined by one authority as the disease commonly called tonsilitis, but differing from the common, ordinary type of tonsilitis sufficiently to be classified as a peculiar and unique pathological condition, which is good so far as it goes. The disease is a variable one, containing many different features, the following of which might be described as characteristic.

Now here is something. There are two points in the following that I think are of some practical value:

The onset is rapid, accompanied by severe headaches and acute "grippe"

pains and high temperature—we know all that—and by general diffuse redness extending over tonsils and pharynx and adjacent regions (resembling scarlet fever throat), but getting right down to the same factors as scarlet fever and sore throat, later small isolated patches of white, resembling ordinary follicular tonsilitis. You have got two things on which you might go astray in the beginning: a scarlet fever sore throat or an ordinary follicular tonsilitis.

In the first stage of the disease, particularly in the first three to five days, we get extreme prostration and a great frequency of complications in the shape of abscesses in the peritonsillar region and the cervical glands. These are two really practical points, perhaps the first daylight you can strike in the darkness that surrounds septic sore throat.

I think any of us who have had the experience of following a true septic sore throat epidemic have been struck all the time by these two distinguishing features when it occurs in an epidemic form: the *great prostration* and the *great tendency to abscess complications*.

The next thing that I think ought seriously to be considered with it is its epidemic feature. I think for practical purposes in this Commonwealth we ought to consider septic sore throat to mean an epidemic entity. That disposes right away, again, of the two possible questions that have been brought up on septic sore throat; its possible association with scarlet fever and its possible identity with scarlet fever, neither of which can be proven.

I think several of you had the pleasure of hearing the whole of the paper that Doctor North gave at the meeting of the American Public Health Association. I personally wanted to get in to hear it, but I got in just in time to hear his conclusion and asked somebody afterwards what his impression was on hearing the whole paper. He summed up in this way: "North did beautifully till he began to draw conclusions, and then he did not seem to get anywhere." And that seems to be the situation when we try to draw conclusions as to the relations between scarlet fever and septic sore throat.

He pointed out some very interesting, very suggestive features in regard to an epidemic that he alleged possibly was a mixture of a true septic sore throat with scarlet fever, or possibly was all one and the same organism producing the two varying effects.

The next thing that we can bring out, perhaps, that needs emphasis, is the milk factor. Broadly speaking, we are pretty apt to find an association of milk running through the true septic sore throat outbreaks.

So I think then that we have a disease that simulates ordinary tonsilitis in many respects and may simulate the oncoming of scarlet fever in many other respects, but roughly may be differentiated from them by the great early prostration, the great tendency to abscess formation in the peritonsillar region and the cervical glands, the tendency to occur in epidemic form and the very marked association in milk supplies.

If we follow those practical points

we won't necessarily be reporting every case of tonsilitis in the Commonwealth as septic sore throat; but we will almost certainly be overlooking the beginning or initial cases of an outbreak of true septic sore throat. If all the physicians had that point in mind I think that soon the common notoriety of the presence of such a condition in their own vicinity would lead them to report these as septic sore throat. I regard this as quite unsatisfactory, but I think probably it is the best practical solution we can work out on this basis.

There are a few things that are of interest that have been said from the standpoint of the infecting organism. Probably Dr. Theobald Smith's opinion is the best on this point. He feels that the streptococci causing epidemics of tonsilitis are not necessarily the same in different epidemics, but that the success of tracing such epidemics to their source will depend largely upon a detailed study of these individual strains and the discovery of certain minor distinguishing characteristics. And another point of very great interest, especially in connection with the very prevalent English opinion, is that at present there is no satisfactory evidence that bovine streptococci associated with mastitis or garget in cows are the agents of tonsilitis in man, especially of the type known as septic sore throat.

It is said that one of the authorities makes the following illuminating statement: that diagnosis from diphtheria and ordinary tonsilitis is difficult and often impossible except by bacteriological examination. I wonder

sometimes how that would read if you left the "except" out and read it: The diagnosis from ordinary tonsillitis is often impossible in bacteriological examination. By carrying differentiating studies we might arrive at a little better conclusion as to whether or not we could give an organism to septic sore throat or ordinary tonsillitis; but by ordinary smear examination—I may be corrected on this, and hope I will be if I am in error, by some of the bacteriologists present—I do not believe at present that anybody can be sure whether he has the septic organism or not.

Certain conclusions have been reached by Hamburger in the bulletin of the Johns Hopkins Hospital that are rather interesting. He feels—to bring out the same idea I tried to bring out a few minutes ago—(1) that an undue prevalence of what he terms influenza infections ought to be reported immediately to the health authorities for investigation; (2) that a streptococcus infection when it is introduced into a community through milk possesses an extreme virulence, and (3) it is possible that raw milk from any dairy, though carefully produced and handled, may at the same time be the source of a streptococcus infection that will be clinically differentiated as septic sore throat.

Question 3. Should Boards of Health furnish hospital treatment free to persons with contagious diseases?

DR. FRANCIS P. DENNY, *Brookline, Mass.*: Mr. President, the question for

discussion, as I understand it, is this: When a board of health isolates in its hospital cases of acute contagious disease, like scarlet fever, diphtheria, measles, shall it make a charge or shall it furnish such hospital isolation free?

In practice that question has been answered, universally as far as I know in this state, by boards of health making a charge. The charge varies from one dollar to two dollars a day. Contagious cases are apt to be taken to the hospital rather hurriedly, without raising the question of board. After the case is in the hospital the bill is sent, usually to the parent of the child. If the patient has no settlement in that place the bill is sent to his place of settlement, or if he has none, to the state. These bills that are sent to other cities and to the state are very certain to be paid, although there may be considerable correspondence and delay before they are paid.

The collection of the bills of those who have legal settlement presents many difficulties. In the first place, some of the patients are so poor that they cannot pay anything. Sometimes the patient is the bread-winner of the family. Sometimes there are several children from the same family in the hospital at the same time, and a man must have pretty good wages in order to be able to pay the board of three children, let us say, for five or six weeks with scarlet fever. It is necessary, therefore, in a certain number of cases to abate the hospital charges.

The fact that A has had his charges

abated makes B very loth to pay his bill, even if B's wages are larger than A's and even if his family is smaller. Some persons become very skilful in representing their financial condition to be poor, when by so doing they can avoid the payment of their hospital charges.

On the other hand, some persons are especially conscientious about the payment of a municipal bill. They feel that it is a disgrace to leave such a bill unpaid. Some evidently think that it pauperizes them, although of course that is not the case. As a result we find some persons of very small means putting themselves and their families to great deprivation in order to pay these hospital charges. I think if any board of health will go over their records critically, as we have done in Brookline, they will find many inconsistencies. They will find that persons of very small means have paid very considerable sums, and, on the other hand, they will find that persons of much greater means have paid nothing at all.

Now, this is not fair and it is not just. A system where people pay what they can is all right for a hospital supported by charity, but it has no place in municipal health work. It is especially unfortunate in a contagious hospital, because the isolation is sometimes enforced there, and is often more for the benefit of the community than for the patient. *It is perfectly fair and just to furnish hospital isolation free to all.* That is what we do in our schools. We furnish free schooling to everybody. That is

what the State Department of Health does in furnishing vaccine and anti-toxin free. It is a perfectly fair system.

Under our present laws it would not be possible for a board of health to furnish free hospital isolation to those who have no legal settlement in their city, because they would have in addition to pay for their own citizens when they are isolated in other places. And that brings us to the consideration of another question. Should not we change our laws so as to make each city and town responsible for the hospital isolation of all its residents, regardless of their legal settlement? That is, of course, what we do in the schools. Every city and town must educate every child residing there, regardless of its legal settlement. It would certainly seem more rational, or equally rational, to require the city or town in which a patient was living when he contracted the disease to be responsible for his hospital care. This would also save considerable expense in determining the settlement of these cases.

To summarize very briefly, there is no fair and just system for collecting the charges for hospital isolation. It is perfectly fair and just to furnish hospital isolation free to all. Under both systems the burden of the expense falls on the community, only with the charge system it falls heavily on the few who are so unfortunate as to become ill; with the free system the burden is distributed evenly over the whole, just as the losses from fire are distributed by insurance. It would

seem as though the tax levy for the maintenance of a contagious hospital might very properly be considered a form of insurance. For these reasons it seems to me hospital isolation should be free.

Discussion.

DR. FRANCIS G. CURTIS: Mr. President, I did not propose replying to Doctor Denny. I agree with the gentleman that every town ought to take care of its residents, and probably free, but how about the unsettled cases, the state cases? Would you except those, and still turn to the State Board of Charity for reimbursement such as they give you?

DOCTOR DENNY: I think that is open to question. My feeling would be that each place should be responsible for the isolation of all residents, whether they have settlement anywhere or not.

DOCTOR HOLDEN: I would like to ask Doctor Denny whether he thinks the same rule ought to follow in tuberculosis. Of course diphtheria, scarlet fever, typhoid fever and tuberculosis, are all cared for under the same law. Scarlet fever and diphtheria are diseases of comparatively short duration; while tuberculosis is a disease of very long duration. Would the same rule apply to tuberculosis?

DOCTOR DENNY: Mr. President, I stated that the question was the isolation of *acute* contagious disease. The financial problem in regard to tuberculosis is a very different one. Tuberculosis is a chronic disease, and a disease that is often contracted a long time before there are any symptoms. I think if each place were responsible for all cases of tuberculosis residing there the city that had the best hospital and adopted the most liberal policy would soon have most of the tuberculosis in the state.

DOCTOR VOSS: It seems to me that this question has been defined by the statutes, in so much as the Board of Health can pay out of their appropriation only for indigent patients. Those who have money are supposed to pay for their care at the hospitals.

MR. KIRSCHBAUM, *New Bedford, Mass.*: I am afraid Doctor Denny has lost sight of one

fact in connection with this matter of cities maintaining isolation hospitals. If this suggestion went through, I am afraid the cities maintaining isolation hospitals would have a large number of visitors if they were to take care of all their residents free of cost. Under the law you are supposed to take care of anyone in your community, and if free I think that people would take advantage of such cities. For instance, as Mr. Jackson says, Wareham happens to be very near New Bedford, and we have an isolation hospital that will probably accommodate 80 or 100. It is a very easy matter to send somebody in from Wareham. It is done right along in cases of tuberculosis, but we do not stand for it. I think that the cities maintaining isolation hospitals would be burdened. People would take advantage of the fact if it was generally known that they were taking care of patients free.

MAYOR CHARLES H. ADAMS, *Melrose Mass.*: I think we all agree that the position taken by Doctor Denny is in the right direction, if a way can be found by which it can be carried out. The burden would be very great upon many communities, but on the community represented by Doctor Denny probably would be comparatively light. Now, in certain private charities they have a system of finding out the income of the family, based upon the earnings per week per person in the family. I understand that in a certain great dental hospital persons are entitled to free treatment or treatment for five cents per visit if the income per week per family is below four dollars for each person, so that a family of five having an income of less than twenty dollars a week would be entitled to treatment at that minimum charge of five cents. I don't see why in relation to these contagious diseases there could not be authority given to the boards of health to abate the charge where the income of a family was less than \$1,000 a year, or \$1,500, or \$2,000, or something like that, so that the board of health could say to the person, "You are entitled to free treatment if your income is below \$2,000," or \$1,500, or \$1,000 a year, just the same as a person going to the board of assessors now in relation to taxes would be told, "You are entitled to an abatement if your income is less than

"\$2,000 a year, you don't have to pay on that." Or if you are a widow you can have an abatement of so much, and there are various systems by which people have a right to have abatements. So that if we should devise a schedule by which persons of small income could have the right to have free treatment in these hospitals it would work out without being a great hardship on the community, and without giving free treatment to those who are able to pay.

THE PRESIDENT: It seems to me the principle enunciated by Doctor Denny is sound, for the reason that the persons who contract these acute contagious diseases are not personally responsible, but the community is as a rule, and should be held responsible, and therefore is financially accountable for the reason that the isolation and the hospitalization is done in the interest of the community. And furthermore, it seems to me that if the person afflicted is a wage-earner this should not only be done free of charge but he should be compensated proportionately for the time he loses, etc.

DOCTOR DENNY: I should like to say, in reply to what has been said about the danger of patients moving into another place when they are coming down with a disease, that my feeling is that in practice that would not often occur, and if it did it could easily be traced out that such a person had moved into a city or town after he had the disease.

MR. JACKSON, *Brockton, Mass.*: Mr. Chairman, we have had experience of walking cases of scarlet fever going right into a doctor's office, men who are travelling salesmen, having a settlement nowhere, and there is a case where the city would have to turn round and pay for somebody that they were not entitled under the law to pay for. The mayor of Melrose stated that boards of health ought to have authority to abate those charges. They have got that authority for anybody who has got a legal settlement in their own city or town, but they have not the authority for a man who has a legal settlement in some other city or town. The only way that we could do that would be for the cities and towns, it seems to me, to take the responsibility of all sickness within their borders, and the state not be held responsible for anything.

Question 4. Is there a need in Massachusetts for short educational courses for health officers?

PROF. WILLIAM T. SEDGWICK: Like those who have preceded me, I have not myself raised the question the discussion of which I believe I am to open, namely, Is there a need in Massachusetts for short educational courses for health officers? I will frankly say that I don't know whether there is or is not, but I do know that in a good many states now such courses are held, and with much apparent advantage.

Take, for instance, the state of Kansas. Doctor Crumbine, the able secretary of the State Board of Health of Kansas, has for some time had in that state one kind of school for health officers, and knowing this fact I wrote to him and asked him if he would write me a description of it which I could read here. He says:

I have your letter, and replying will say, that five years ago we held our first summer school for health officers,—

A Summer school for health officers!

The school lasting for one week.

Previous to that time, we had annual conferences of health officers, which most boards of health hold, but we came to the conclusion that not much benefit was being derived from such conferences, as they could scarcely be considered schools of instruction, but rather an opportunity for the health officers to exchange opinions and to read addresses which they, themselves, prepared.

Our schools are real schools of instruction. The faculty is composed of expert sanitarians from the United States Public Health Service and from different state boards of health, to—

gether with the chiefs of the different divisions of our own board.

Last year the course was lengthened to two weeks, and the enrolment for the course was the largest it has ever been, namely, 82.

The difficulty in holding such a school is that there is no statutory requirement of attendance, and the majority of health officers who do attend, are required to do so upon their own time and at their own expense. It is remarkable that we have had such a large attendance in view of the above facts.

The benefits that have been derived from this school are, in my judgment, very great: First, it produces team work and *esprit de corps* among the health officers, without which the work at large is very greatly hampered; second, it puts health officers in possession of the latest information in the field of public health, which many would not get otherwise, as they are all busy practitioners; third, prevention is exalted in the minds of the health officers, and slowly but surely the notion is being brought home in an effective fashion that only the full-time health officer can properly serve the public in such a manner as will be acceptable to his own conscience, and for the best good of the community.

Taking all together, the Kansas Summer School for Health Officers has been of great value in carrying on public health work in this state.

That is from Doctor Crumbine, and he sends me a lot of interesting details which I won't take your time to read, but which describe the staff, the certificate of attendance, and stating that the work of the school is under the direction of Doctor Crumbine, who is secretary of the State Board of Health and also dean of the school of medicine of the University of Kansas, assisted by a council which he names. There are no fees charged for any of these lectures. The lectures are given in the offices of the State Board of Health. Students are re-

quired to supply themselves with note books, etc. And then a long list of teachers, many of them men of eminence, covering two or three pages.

Kansas is a western state, and a large western state, and yet I would have you notice that those people, 82 in number, have taken these Courses, paying their own expenses. It seems to me a most creditable thing.

In some states attendance at meetings like this one today is required by law, and the legitimate expenses of health officers attending the meetings are paid by the towns to which they are accredited, becoming a fixed charge upon those towns.

Kansas is not in New England, and so I wrote to Doctor Caverly, Chairman of the State Board of Health of Vermont, where as you know an important short school for health officers has been held for some years, to ask his opinion and some details about the work, and he says:

Our Vermont law provides for one health officer for each town.

That in itself is interesting!

A decision of our Supreme Court makes it necessary that the health officer of each town be a citizen of his town. These legal requirements give us two hundred and forty-seven health officers in the state and approximately one hundred of these are laymen, there being no physicians in that number of small towns.

In 1898—

And you will notice that was much earlier than the Kansas plan.

In 1898, we secured the enactment of a law, providing for a laboratory of hygiene. The bacteriological examination of blood, excreta, etc., for diagnostic purposes was comparatively

new, and many physicians were unfamiliar with the significance of this work. To the laymen, of course it was a *terra incognita*.

Our board determined at that time to call the health officers together at the laboratory and instruct them in this work, especially with regard to its meaning in connection with practical preventive work. Of course the health officers, under our invitation were obliged to come at their own expense, unless they could convince their local authorities that it was worth while to pay their bills. Few, I fancy, were able to do this, but it resulted in a fairly good attendance, and much good in our campaign against contagious diseases. It was in truth a school, in which the chief instructor was Dr. J. H. Linsley, through whose enthusiastic work the laboratory has been established.

Thereafter, a meeting of the health officers, still called a school, was held annually, some time during the summer, lasting four days. The advantage of this school was so apparent that the legislature soon enacted a law, providing that all health officers attending it should receive four dollars a day and their actual expenses, while so attending, to be paid by the town or city each represented. There was some difficulty with this law on account of the inpecunious tendencies of some of the smaller towns. For this reason, the legislature, four years ago, amended this act, so that the state pays the bills of all, *i.e.*, each health officer receives four dollars and his expenses from the state treasury for days he is actually in attendance: and we have a system of checking them so that we know who attends each day.

We have, as you know, drawn pretty generally on the whole eastern part of the country for instructors at these schools. In looking over old programs, I find at the seventeen sessions of this school, which have been held, that there have appeared, besides your own name, the names of Dr. J. H. McCollum, William Paul Gerhard, Cressy L. Wilbur, Dr. Samuel H. Durgin, Professor H. M. Woodbridge, Dr. D. E. Salmon, Dr. George H. Fox, Professor M. P. Ravenel, Assistant Surgeon General H. D. Geddings, Dr. S. A. Knopf, Dr. Hibbert W. Hill, Mr. X. H. Goodnough, Dr. George M. Gould, Professor F. C. Robinson, Mr. H. W. Clark,

Dr. Daniel Lewis, Dr. H. M. Biggs, Mr. George C. Whipple, Dr. H. W. Wiley, Mr. George W. Fuller, Dr. Thomas Darlington, Professor C.-E. A. Winslow, Dr. C. O. Probst, Professor J. O. Jordan, Dr. Livingston Farrand, Dr. George M. Kober, Dr. G. T. Swarts, and Assistant Surgeon General Rucker. These are some of the names that appear on our programs, which you will recognize, and you will, I think, agree that if the instruction can be gauged by the character of the instructors, our health officers have had a pretty good education. Of course the fact remains that many of them are laymen, and all are engaged in other pursuits for a living. There have been distinct advantages, however, in having many laymen on our list, as it has tended to popularize the work. We are hoping before many years to obtain county or district whole-time health officers.

As I said at the beginning, I really do not know whether in Massachusetts there is or is not need for short educational courses for health officers. We think we have in Massachusetts one of the best long-time schools for health officers in the whole country, managed as it is by Harvard University and the Institute of Technology; and you have heard one or two speakers this afternoon who have been through, or are going through, that school, and you have approved their points of view. Massachusetts, too, is a compact state. It is less rural than most states. It is very urban. Whether states like Rhode Island and Massachusetts, which are so small and so urban, do or do not need schools of this kind, I am at present unable to say. In these other states from which I have quoted there have been obvious advantages, according to the reports of the health authorities as I have read them. Many of you know that in the state of New

York there is held an annual conference of health officers which amounts to a school, and I believe the same thing to be true in other states.

The question is certainly an interesting one, but my task was merely to open the discussion, and I trust that I have now done this.

Discussion.

MR. B. R. RICKARDS, *Boston, Mass.*: The Massachusetts Association of Boards of Health, having a voluntary membership, performs a function somewhat different from a school for health officers where the attendance is compulsory. Perhaps Massachusetts is therefore in less need of such a school. Those who voluntarily attend the meetings of this Association doubtless come with a far different attitude than those who attend obligatory health organizations and the benefits they receive are correspondingly greater. But the point appeals to me that the health officers of this state, or members of boards of health, who most need information and instruction along health lines, are the ones that are never seen here. The speaker has been away from Boston for a number of years, but the faces he sees here today are those that he used to see at every meeting of this Association, years ago.

Some years ago I had an official connection in the West with just such a school for health officers as Professor Sedgwick has mentioned. The attendance was compulsory. The expenses of the health officer in attending that school were met by the local authorities. In a great many communities at least an obligatory attendance is distinctly advisable, for just so long as undertakers, plumbers, and others with little or no training in health work are appointed to responsible health positions, just so long must compulsion be used to enforce attendance at health schools.

The attitude of many who came to the health school was: "I must go anyway, my expenses are paid, and here is a good chance to have a vacation at the expense of the community." And they came. The results were good. They

were obliged to actually attend the meetings by a system of checking, such as has been mentioned and whether they wanted to or not it is pretty certain that they went away with a certain amount of very useful information. The State Board of Health fathered these meetings, and it gave that State Board of Health an opportunity of directing the attention of these health officers along the most useful lines.

A compulsory school for health officers would have less place in Massachusetts than in some other states, but is there not a want to be filled among the health workers who do not and will not attend the Massachusetts Association of Boards of Health, and who are not of themselves interested in health matters?

DOCTOR VOSS, *Beverly, Mass.*: Mr. Chairman, it seems to me that in Massachusetts we have adequate health facilities, but what we mostly need is the application of the A, B, C principles of applied sanitation throughout the different municipalities in the state, and in order to get that we must have the sinews of war. Our boards of health are woefully inefficient, because they have not the necessary money to carry on an undertaking of this kind. As a rule the doctor who goes on to the board of health is generally the goat, because the boards of health are frequently used as clearing houses for enmities and revenges and neighborhood fights. That makes a mighty disagreeable part of the work of anybody who has to be associated with board of health work, and there is no need, no good reason that I have ever heard, why anybody should make this sacrifice in the interest of public service, to give his time for the public health, because it is a thankless job usually. We need the practicable application of this work in every community in this commonwealth. I believe that Mr. Ford, of the Ford Automobile Company, when he raised the wages of his employees to a minimum wage of \$5 a day did more for public health work than all the theorists, pedagogues and every other agency in the land. Paying his 20,000 employees \$5 a day, making each of them a part of his corporation, an integral part of his corporation, with his profit-sharing system, and the extension of his industrial service system to the very homes of his

employees, looking out after the sanitary conditions of the home, for the home after all is the place that makes for good or evil in every community, I think that he has done a great deal in the cause of public health. I can only refer, furthermore, to the remarks made by Colonel Gorgas of the Sanitary Commission in the Panama Zone, that he never accomplished very much in regard to public health activity until he improved the economic conditions of the people. So there we have the cardinal principles of medicine, psychology and economics, to be taken into consideration. We need additional legislation to extend, to correlate this work throughout the state, between the different municipalities and between the state and the

municipalities, and if necessary to subsidize these small boards of health that have not the necessary amount of money to carry on this work in a proper way. The laws of 1913 have curtailed the work of a board of health, inasmuch as they do not allow the board of health to exceed their appropriation which is made at the beginning of the year, under a penalty of \$1,000 fine and a year's imprisonment, even in the face of an outbreak.

I believe that law should be repealed. It should be considered seriously by the Association, because it not only affects the activity of the board of health but also the poor departments.

The meeting then adjourned.

Book Review.

"Peg Along." By George L. Walton, M. D. 197 pp. Philadelphia: J. B. Lippincott Co. Cloth, \$1.00 net.

Another gossipy book, "Peg Along," by Dr. George L. Walton, has just appeared, which pleases while preaching a philosophy of living very much needed today. Carlyle tells us that "the true Peptician was that countryman who answered that 'for his part he had no system,'" and pointed out long years ago what is Doctor Walton's text "Let but any organ announce its separate existence, were it even boastfully and for pleasure, not for pain, then already has one of those unfortunate *false centres of sensibility* established itself, already is disarrangement there."

Doctor Walton in his introduction tells us that he has been preaching to himself, quite as much as to his readers; but he assists his readers by giving briefly, in Chapter 2, a word about managing the mind. He tells people that "mind" has its physical basis and that brain integrity is needed for normal cerebration, and how in the lack of this "we have the making of self-inflicted martyrdom, of over strenuous insistence to accomplish ends, of anger, fear and shame, the results of which cause more nervous breakdown than any amount of hard work."

In Chapter 3, the author illustrates the necessity and value of industry and accurate mental habits, and illustrates this from the lives of Francis Bacon and Benjamin Franklin and follows this with a chapter telling "What anyone can do," and by illustrations showing how bad habits may be overcome and good ones cultivated, while making due allowance for individuality.

In Chapter 5 a more positive attack is made

on individual aberrancies, and the author handles admirably the vice of "egoism" which is Dr. Max Nordau's evidence of initial degeneracy, in the chapter on "Over Insistence." This chapter would have been more valuable if the lesson of "starved nerves" and their irritability had been made yet more explicit; as also the inducing of neuroses transmissible to offspring, through the stress and pressure of modern urban life. For, as Dr. Creighton Browne says, "we are becoming more jumpy than we used to be." The "approbativeness" of Chapter 5 is but another expression of degeneracy in inherited neuroses or indeed in starved nerves. If Doctor Walton could only be heard daily in Wall Street, in Suffragist assemblies or even in holiness meetings, it is just possible that some of the fads—some of which have flourished even in Boston—might become less prevalent and the evils growing out of them lessened.

The "Fret" of Chapter 7 is but another link in the vicious circle which is elaborated by that on "Playing the Martyr." The rational life is illustrated in Chapter 10, and sets in relief the antithesis of "Fret" and is followed by a chapter on "Work and Play."

These chapters point to the remedy for much of the hyperæsthesia of today, but would perhaps have helped us more if they had dealt with the preventive side of what Nordau pictures so clearly in his *Fin du siècle* individual.

Altogether Doctor Walton's little book is a valuable contribution and ought to prove of use to many who are requiring a mental *placebo*.

Peter H. Bryce, M. D.

Health Department Reports and Notes.

REPORTS.

Montclair, New Jersey.

In the Annual Report of Montclair one has come to expect an effective expression of the highest grade of public health work. This town of 26,000 population has had now for some twenty years a constantly improving scientific administration, and it is therefore not surprising to find the 75 pages of its latest report teeming with the details of work that runs far into advanced administration. The health officer, Mr. C. H. Wells, reports the lowest death-rate (9.4 per thousand) in the history of the town, with remarkable low general and infant mortality rates in parts of the town which until recently had persistently high rates, and with only three deaths for all the reportable communicable diseases other than tuberculosis. There is now a saving of over 100 lives per year compared with the rate of twenty years ago.

New ordinances were adopted regulating: (1) sale of wood alcohol, (2) laundry work, (3) health of employees in food manufacturing establishments and barber shops, (4) milk and cream supplies, (5) reporting of confinement cases by midwives. This last named requirement calls upon midwives to report to the Board promptly upon being called to attend the case, by which means these women are brought to a greater sense of responsibility in reporting births, while the health department nurse is enabled to visit the home at the earliest possible time instead of waiting, possibly, five days, the period allowed by law for reporting births.

The vital statistics have been carried to a high degree of accuracy and refinement. Birth registration, for example, is believed to be over 99 per cent. complete, the result of the campaign of recent years. In order to obtain accuracy in birth certificates the Board sends to the parents of every child born an attractive certified copy of the filed certificate, with the request that if any of the particulars is in error the copy be returned with correction. Eight per cent. were thus returned, showing, as the health officer says, "how careless physicians are, as a

rule, in filling out these most important documents." "We believe," he adds, "that by the increased accuracy of the records and the knowledge by the parents that they should receive from this office a copy of the certificate of birth, this plan will do more for improved birth registration than almost any other one factor."

Attention is called to the increasing importance of cancer, apoplexy, and diseases of the heart, kidneys, and arteries as causes of death. Over one-third of all the deaths in the town are now from these causes, a ratio more than twice as high as existed twenty years ago, and this is a real, not merely an apparent, increase in the death-rates for these diseases. Attention is also called to the seriousness of the mortality from the so-called minor communicable diseases, measles and whooping-cough. From the statements and tabulations of the report, deaths of non-residents occurring in local hospitals (but, properly, not those of other temporary residents) are excluded, a separate tabulation of them being given. Non-resident births are treated likewise. A noteworthy finding is the relatively low death-rate of the Italian population of the town, numbering 3,280. Among this population, moreover, there is practically no tuberculosis.

Under the head of communicable diseases a convenient feature is a summary of the rules for quarantine-periods, together with a list of the supplies and examinations offered. All cases of syphilis and gonorrhea must be reported, though the name need not be given except when the Board is asked to make a laboratory diagnosis or furnish treatment; and good progress has been made in obtaining reports. The tuberculosis reports are very complete, as is shown by checking the deaths against the case-records, and the number of reported cases shows that the disease is on the decrease, notwithstanding the increase for the year in the number of deaths.

Infant mortality and the effective measures for its reduction are reported upon at length, as are other subjects of which space forbids mention here.

The supervision of the milk-supply has always been a notable feature of the work at Montclair, and the present report records further regulation, the chief new requirement being that employees, who handle milk not to be pasteurized, be subjected to a thorough physical examination every three months in order to detect the presence of any communicable disease. Suitable examinations must also be made to determine whether or not the employees are typhoid carriers. The most conspicuous single feature of the milk work was the discovery of the fact that, in spite of the filing of the legally required certificates, over 30 per cent. of a certified dairy herd was tuberculous. The measures of vigilance by the Board of Health which resulted in detecting and correcting this dangerous condi-

tion are fully recounted. The results of milk, cream, and ice-cream supervisions are analyzed and set forth very fully for the individual dealers. Bakeries and food-supplies also are carefully supervised. Meat is required to bear the approval stamp of a competent official inspector; thus the town guards itself against uninspected supplies.

Firmness of action in bringing delinquents to book is shown in a list of specific cases summoned before the Board or the Recorder. A functionally analyzed financial statement completes this highly satisfactory report. The per capita health expenditure was 48 cents. In addition to the usual edition of the report, there were also printed at a moderate expense 3,500 reprints for house-to-house distribution in the town.

Orange, New Jersey.

Orange, another member of the smaller city class, contiguous to Montclair, is notable for having also placed its health work on a sound modern basis through reorganization, in this case much more recently, some seven years ago. The expenditure for health purposes here is not nearly so high, viz., 26 cents per capita, but a perusal of the latest report, for 1914, is convincing evidence that the money is so applied as to give the maximum possible results.

The staff, under the direction of Health Officer Frank J. Osbourne, comprises two sanitary inspectors, a plumbing inspector, a health department nurse for infant hygiene work, and a clerk, while the nurse of the local Anti-Tuberculosis League is authorized as a special inspector. Considerable milk work was also performed by a special inspector provided by the Civic Committee of the local Woman's Club, the activities of which contributed largely to the establishment of the system of milk-supply control mentioned below. Such facts show that Orange has profited greatly by coöperation with private organizations which made possible, with the advice of the health officer, work which would have been impossible on the Board of Health appropriation. This work, having been proved of high value, has now, with the exception of that of the tuberculosis nurse, been assumed at the city's expense. The history, in this instance, of the development of the recognition of public responsibility through unofficial activity is a most

encouraging one for communities striving with similar problems on an insufficient official appropriation.

A special aspect of the local situation is that Orange is one of a group of closely contiguous communities in continuously urban area. This fact has had a very practical bearing on the control of milk-supplies, which are largely in common for the several communities, and a recognition of this circumstance has led, after several ineffectual efforts in the past, to the formation of a Joint Milk Committee for the Oranges. The pooling of resources by this medium has enabled the committee to employ a joint milk and dairy inspector and to proceed to the formulation of a plan for legally grading the supplies according to the best modern practice. In the section of the present report covering the local milk-supplies full and commendable publicity is given to the bacteriological and chemical results and inspection scores for the individual supplies.

The employment of a full-time infant hygiene nurse, working in coöperation with the local diet kitchen and the Visiting Nurse Association, has been followed by most gratifying results, for the infant mortality rate for the year (57 deaths per thousand living births) was not only "the lowest in any city of the state of equal size, but, so far as can be ascertained, was the lowest of any city of comparable size and character in the United States." In this field, too, coöperation with the

other communities has been effected through the formation of a Baby Welfare Association, which is practically a central council of all organizations concerned in such work in the four Oranges. The effectiveness of this representative body in apportioning responsibilities and standardizing the work makes it a noteworthy example of what can be accomplished by coöperation without surrender of individuality.

That the tuberculosis situation is well in hand is shown by the much reduced rate of 151 deaths per 100,000 of population, representing a decrease of 50 per cent. in ten years.

The general death-rate for the city (11.54 per thousand of population) was the lowest in its recorded history. Analysis of this rate shows that, as in other places where health protective measures are showing their effect, the percentage mortality in those age-groups most affected by the preventable, transmissible diseases is on the decrease, while in the upper age-groups, affected chiefly by organic and functional diseases, the mortality is increasing markedly. Thus, while the mortality under five years has declined, that above 45 years of age has increased from 38 per cent. of the total deaths in 1908 to 51 per cent. in 1914.

Three limited outbreaks of scarlet fever are briefly but thoroughly discussed. One of these

is attributed to a missed case in a school-child, one to milk, and the third to contact as a possible sequence to the milk-borne outbreak. In view of the actual importance of measles and whooping-cough as causes of death, it is rather unfortunate that these should be treated in the present report under the separate head of "minor contagious diseases."

One of the notable advances of the year was the establishment, by the city, of a venereal disease (genito-urinary) clinic at the local hospital, the second clinic of its kind in the state. "Much care," says the health officer, "is exercised in following up and investigating cases to see whether or not they are in a position to pay for the cost of treatment, as our purpose is not to provide indiscriminate free treatment or to take patients already under treatment or care of a physician; but to reach those who either could not or would not engage a reputable physician and who might therefore neglect treatment entirely or fall prey to an unscrupulous quack, which might prove to be even worse."

In closing, the Commissioner of Public Affairs, Health, and Sanitation, who presents the general report, emphasizes the immense value of the coöperation of the public, without which the most efficient public health work is not possible.

NOTES.

Pittsburgh Baby Week.—Pittsburgh Baby Week has been receiving considerable attention over the country. The *American City of New York* had an extended article with several illustrations. The *Survey* reproduced a photograph of one of the little plays. The *Journal of the Outdoor Life* published entire the two plays or interludes written for Baby Week by Prof. G. M. P. Baird, of the University of Pittsburgh, together with photographs of the production of these plays by the Irene Kauffman House and Woods Run Settlement. The *Journal of the Outdoor Life*, 105 East 22nd Street, New York, has reprinted the plays in booklet form. It is probable that the publisher would send copies if return postage is enclosed with the request.

Several women's clubs and other periodicals have had more or less brief articles on the Baby Week activities.

The latest publicity given to the Pittsburgh

health activities is in the form of three references to Baby Week in the new bulletin on "Child Welfare Exhibits," written by Miss Anna Louise Strong and published by the U. S. Children's Bureau at Washington. In this bulletin Miss Strong suggests the adoption of the "flag-distribution day" plan which was first introduced at Pittsburgh last summer. Reference is also made to the exhibit device illustrating "a day in a baby's life." The following is said about one of the two little plays used during the Pittsburgh Baby Week: "It depicts a fairy court, to which, amid dances and fairy revels, Thistledown brings an earth baby stolen from conditions which she graphically describes. In punishment for her theft she is condemned, greatly to her dismay, to become herself that much loved and much abused thing, an earth baby, until such time as mothers learn to treat their babies properly. The play closes with a

picturesque appeal to the audience to help free poor Thistledown."

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New York State Organization for Public Health Nursing.—The formation of a New York State Organization for Public Health Nursing, which was consummated during the annual meeting of the New York State Nurses' Association late in October, marks an important advance in the already far-reaching work done by public health nurses in the state.

This organization was formed as the result of a long-felt need and a widespread request from public health nurses throughout the state, that they be brought into closer contact with each other and each other's work.

The importance of this step is evidenced by the avowed purpose of those who have come together in this new body to stimulate the extension throughout New York State, of the widely varying services which nurses may offer to the public both in sickness and health; to standardize as rapidly as is expedient the various branches of public health nursing; to assist in the development of instruction in public health matters to nurses in training; to seek to extend the provisions for skilled nursing of the sick poor in their home; to increase and broaden the teaching of hygiene and sanitation by nurses; to assist in the enforcement of all public health laws and rulings; to have at its annual meetings round table discussions on visiting nursing, infant welfare, tuberculosis, mental hygiene, prevention of blindness, welfare nursing, school nursing, etc., in order that there may be a helpful interchange of ideas and suggestions on these subjects; and also that the members may be kept informed concerning the progress and development of methods of work in all phases of public health nursing.

In short, this federation of public health nurses and nursing organizations in New York State promises to be a vigorous, inspiring body, which will help its members and stimulate them to give more effective assistance in the splendid effort not only to relieve the afflicted, but to make the health of mind and body infectious. The new organization has as its ideal the fulfillment of the vision of Florence Nightingale, who saw the nurse of the future not only caring for the sick but helping to safeguard the health of the community.

The officers elected for the first year were: President, Carolyn C. Van Blarcom, New York City; vice-president, Mary V. Crich, Peekskill; recording secretary, Rose O'Hare, Buffalo; corresponding secretary, Elinor Bridgeland, New York City; treasurer, C. Josephine Durkee, Albany; while chairman of committees on each of the branches of work above mentioned will soon be appointed.

The New York Organization will follow the course adopted by similar bodies in other states and form a part of the National Organization for Public Health Nursing, and also will be affiliated with the New York State Nurses' Association. All individual nurses and groups of nurses engaged in various kinds of public welfare work are being invited to join the organization and assist in promoting its ideals.

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Medical Inspection of School Children.—The appointment of two additional school nurses in September, thus giving the Health Department a staff of four nurses and four physicians for this work, has greatly increased the efficiency of this branch of public health work. Each nurse now accompanies a medical inspector on his visits to the schools, assisting him in handling the children while he makes examinations or vaccinates. The nurses also keep accurate records and reports of all cases, and devote the time after school hours to visiting the homes of those children who seem to need some individual attention.

This follow-up work is most important. The medical inspector's duties end at the school. He cannot prescribe for nor treat cases. He can exclude a child who needs medical attention and send a note to the parents, advising them of the condition, but he cannot follow the child to its home to see that his instructions are carried out. The nurse visits the child in its home to explain the condition to the mother, and to find, if possible, the underlying cause that has brought about the trouble. If necessary, she arranges for competent medical attention, without charge, and sometimes personally takes the child to the physician.

Since the opening of the schools this year, there have been 27,300 children examined, 4,290 of whom were retained for care and observation on account of needing medical attention. Eighteen hundred and twenty-one children have been vaccinated. The nurses have made 365

visits to the homes; 87 children have been given attention at the clinics, and 41 children have been cared for by private physicians.—November Bulletin, Louisville Health Department.

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Oregon's Advertising Quack Law Upheld.—

The validity of the law forbidding the advertisement of sex medicines, passed in 1913 by the Oregon Legislature, has just been upheld by the state Supreme Court. The facts are given briefly in the *Bulletin* of the Oregon Social Hygiene Society.

On May 14, 1914, an indictment was filed against E. A. Hollinshead and I. R. Stearns, charging a violation of the statute by an advertisement posted in the drugstore of "our one exclusive agent" in Portland.

The advertisement announced in some detail a "new discovery for men . . . only quick, safe remedy," with the customary "guarantee" of cure or money back. The defendant was convicted and fined \$100 in the Circuit Court. His appeal was referred to the Supreme Court which now sustains the conviction.

In the opinion Justice Henry L. Benson wrote:

"For many years it has been recognized by publicists and legislators that some drastic action is necessary to check certain social evils and to protect youthful and inexperienced humanity not only from easy access to vicious and immoral practices but also from the schemes of designing men who, for the sake of financial profit, would prey upon the calamities of the unfortunate who have sowed the wind and reaped the whirlwind. Further than this, it has been thought that the act of spreading broadcast, by means of advertising, the idea that certain venereal diseases are easily and cheaply cured, is against public policy in that it has a decided tendency to minimize unduly the disastrous consequences of indulging in dissolute action.

"These views were evidently the moving principle of our legislators in the passage of the act under discussion. The purpose of the act is clearly in the interest of the public morals. It is not class legislation for it applies to all who may be engaged in a like business."—*Survey*, November 20.

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Rabies in Ohio.—According to the weekly *Bulletin* of the Cincinnati Board of Health, rabies in that city and throughout the state is

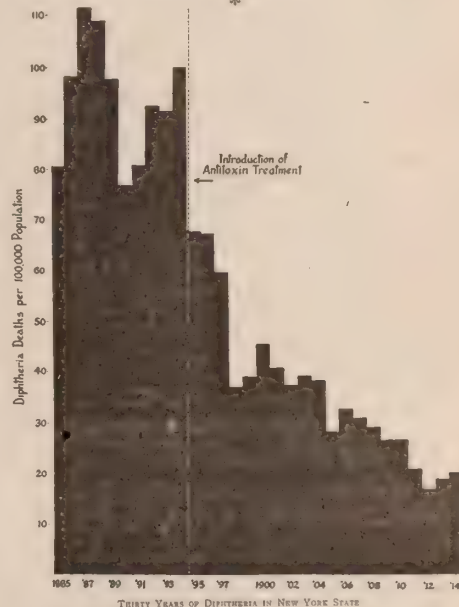
dangerously prevalent. Since the first of the year the State of Ohio has examined the brains of 189 animals thought to have had rabies. Of this number, 115, or approximately 60 per cent., confirmed the suspicion. Also the city board of health examined 24 cases and in 14 cases the disease was detected. Throughout the state five cases have been reported, which seem to have resulted fatally, and during the last month six people in one county, after having been bitten by a rabid animal, are undergoing the Pasteur treatment.

The *Bulletin* says:

"It is difficult to understand the apathy of the general public on the question of the control of the dog population. Valuable live stock can be destroyed, helpless children torn to ribbons and others subjected to the most terrible death known, and any attempt made to enforce the muzzling laws arouses a storm of protest wherever tried.

"New York City has a muzzling ordinance which it strictly enforces, and the results have been immensely successful—rabies has practically been done away with there."

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Reproduced from Health News of New York State Department of Health for November, 1915

Control of Measles.—In a paper on "The Transmission and Administrative Control of Measles" by H. F. Gray of Palo Alto, California, there is outlined a method of control of epidemics of measles. In the summer of 1914, the writer was up against an epidemic in his city. Careful records were kept, and, feeling that the usual methods of handling outbreaks of measles were inadequate, a number of experiments in handling the outbreak were tried.

"Measles had been absent from Palo Alto from June, 1913, to May, 1914; previously there has been only a few scattering cases for several years. As a result there was a comparatively large number of non-immune children, presenting a fertile soil for the development of the disease."

At the beginning of the epidemic the department's rule in regard to exclusion from school and isolation was enforced. This called for placarding isolation and exclusion from school of all members of the family for a period of 3 weeks from date of appearance of the rash. However, acting upon the results of certain experiments on the infectivity of measles, the period of isolation and exclusion from school was reduced to 10 days; contacts were permitted to attend school for a period of 7 days after the date of probable exposure to the infective stage of a case, which was assumed to be 4 days before the appearance of the rash. Terminal disinfection, believed to be useless and a waste of funds, was omitted.

"From a study of an epidemic of 254 cases of measles when considered in connection with recent laboratory work on the disease, I believe that the following conclusions are justified:

"The minimal period from exposure to first symptoms was 7 days; the maximal, 14 days; the average, 11 days.

"The minimal period from the appearance of the first symptoms to the appearance of the exanthem was one day; the maximal, 7 days; the average 3 days.

"The minimal period from exposure to the appearance of the exanthem was 11 days; the maximal, 19 days; the average 13.5 days.

"The distribution between the sexes was very nearly equal, with a slightly greater number of males than females.

"The average age of cases was, in males, 7.6 years, in females, 9.5 years. The incidence was

greater in males at 6 years of age, in females at 8 years.

"The cases in this epidemic were generally mild in character, only one severe case being reported. There were no deaths. The rate of attack per 10,000 of population was 487 (258 cases within the city limits in 1914 for a population of 5,300). Estimating an average case fatality of 4 per cent., we might have expected about 10 deaths. That they did not occur may be attributed to the mild character of the outbreak, to a very general intelligent care of the cases, and to the excellent sanitary condition of the city.

"Measles may be infective as early as 5 days prior to the appearance of the exanthem; the appearance of the rash marks probably the height of the infectiousness of the disease; the infectivity does not extend beyond 7 days after the appearance of the rash, and is probably shorter. The experience of the New York City department of health is that the disease is probably not infective 5 days after the appearance of the rash, and the experiments on monkeys would indicate that the infectiousness ceases with the approach of convalescence.

"In view of the conclusions set forth in the previous paragraph, it is apparent that the usual regulations in force for the control of measles are excessive on the one hand and inadequate on the other.

"The essential points in regulations for the control of measles are: The case shall be recognized and isolated at the earliest possible moment; the premises upon which the case is isolated shall be placarded; the patient shall be isolated for at least 5 days after the appearance of the exanthem; adults and children who have previously had the disease need not be restricted, but it is advisable to warn them as to the slight possibility of second attacks, and keep them under observation; children who have not previously had measles and who are in contact with cases, need not be restricted for 7 days after contact, but should thereafter be isolated for at least 10 days and carefully observed. Disinfection after measles is useless and unnecessary.

"Transmission of measles by third persons or fomites must be exceedingly rare, if it occurs at all."

Infectious Diseases.—S. D. Hubbard, New York (*Journal A. M. A.*, Nov. 20, 1915), publishes and discusses the responses to a questionnaire sent out by the Department of Health of New York City to the health authorities of sixteen of the largest cities in the United States in regard to the treatment or management of cases of infectious disease. Scarlet fever, measles and diphtheria were the diseases specially investigated, and the question included the matters of quarantine, exclusion from schools and from business requiring the handling of food, the termination of quarantine, the question of carriers, the laboratory diagnosis, the determination of cure and the various other methods of preventing spread of the disease. The answers are given in full, and the former and present methods are stated in parallel columns in order to contrast and demonstrate the methods in vogue in New York City. Similar procedures are practically adopted in nearly all the other cities from which answers were received. Instead of excluding members of the infected family from school, as was formerly the case, at present for cases satisfactorily isolated immunes may return at once to school when the disease is measles, scarlet fever or diphtheria. In case of the latter, trial cultures are required in New York. In some of

the other cities exclusion has not been relaxed in scarlet fever and diphtheria, and in a few the same is true as regards measles. The tendency is apparently growing to dispense with quarantine periods and with fumigation of premises, and this is in accordance apparently with the best modern opinion. On the other hand, restrictions are as firm as before with regard to handling of food and the determination of cure, especially in diphtheria cases. Hubbard calls attention, however, to the ultraconservatism in several cities like St. Louis, Philadelphia and Cincinnati in regard to the isolation period. Some cities accept reports of diphtheria without laboratory confirmation, and definite periods of quarantine are set without regard to the presence or absence of the germs of the disease. Disinfection by cleansing is coming into favor instead of the practice of fumigation of apartments, and in New York two negative cultures are required, twenty hours apart, and preferably from both nose and throat. In public health work, Hubbard says, no one plan will apply everywhere, and the best, safest and most economical method of prevention and control of infectious diseases is that which is most free from unnecessary restrictions and at the same time is consistent with demonstrated methods and scientific knowledge.

Public Health Notes.

Death Certificates.—"Diagnosis and certificates of death, with special reference to cancer, are discussed by J. S. Lewis, Buffalo (*Journal A. M. A.*, Oct. 23, 1915). He remarks on the difficulties met with by a registrar of vital statistics. One may call a disease anything or many things at the bedside, provided the patient is wisely treated, but for the Bureau of Census the diagnosis can be but one thing, and that as near the actual truth as possible. With certain causes of death comparative accuracy is possible, and all deaths followed by necropsy are accurately reported, but causes that arise from conditions that remain hidden within the body cavities are likely to be of doubtful value, and the sources of error are many. How often is the diagnosis right? Cabot made a serious attempt to contribute something on this subject and others have confirmed his statements. It is a common weakness of doctors, with a patient's

abhorrence of perplexity, that we fear to face our own diagnoses. With a necropsy in prospect few of us care to commit ourselves, as we inevitably must on a death certificate. He points out some of the reasons why statements of death must necessarily be to a large extent guess work, and he gives examples in tabulated form of contradictions noted, improperly given causes of death and conflicting diagnoses. The insane asylums are, he says, a fruitful source of conflicting diagnoses, for in most cases in which patients die of a well-marked psychosis, other important causes give way. Comparing the years 1914 and 1894, the faulty diagnoses might be supposed much more frequently incorrect in the earlier years, but conflicting causes were rarer. The figures, however, show a definite increase of definite and accurate diagnoses in 1914. The physicians were more careful, but there still remain many evidences of confusion

and inaccuracy. Taking up the question of cancer diagnosis, Lewis goes into a rather elaborate discussion, and gives a number of tables, and shows that an improved diagnosis is a factor in the apparent increase of cancer throughout the world. The studies of Cabot and others indicate considerable error in the general conclusion based on the reports of a large increase in cancer. We must allow, however, for a margin of error, from 10 to 90 per cent., according to the difficulties in the case. When the death certificate is called on to prove anything, the limits of inaccuracy are still broader and more uncertain. He concludes that the majority of all deaths take place under circumstances that make accurate diagnosis improbable or impossible, and the sources of error are of a nature tending to increase the apparent cancer death-rate. Aside from deaths due to contagious or epidemic diseases, violence, or with causes verified by necropsy or operation, all other causes are proportionately subject to inflation or diminution owing to influences apart from the actual incidence of a given disease. The final classification of diseases for the census should be modified to separate conclusive from fallacious causes, and a large place be left for causes uncertain in character. Only universal necropsy will render death-rates for disease accurate, and as a preliminary measure to introduce universal necropsy the law should allow it to be performed whenever the deceased or nearest relative does not prohibit. This would tend to break down useless prejudice. If there is anything to be gained by the cancer statistics of this country as they are at present with regard to cancer increase, it is rather in figures from small well-ordered communities, covering many years, where the figures may be controlled on the spot, than in taking broadly summarized figures of a general census for cities, counties and states."



Destruction of Lice and Treatment of Phthiriasis.—A study of the destructive effects of various chemicals on lice was made. Of all compounds investigated, anisol, a methylic ether of phenol, was found by far the most efficacious, both in paralyzing and in killing the parasites. Methylated cresols were also found very active. In phthiriasis, the use of a 2.5 or 5 per cent. solution of anisol in dilute alcohol is advised. One drop of this solution will kill the parasite in one

half minute. Spraying the solution over the scalp, beard, axillae, pubis, and intergluteal space kills the grown parasites as well as their nits. The application should be repeated two or three times, if required. The skin is unaffected. Lice on clothing are destroyed if a spray of 2.5 per cent. anisol is applied and the clothing kept in air tight closets for three hours. Where, as may be the case at the front, removal of the clothing is impracticable, anisol solution should be freely and repeatedly sprayed between the outer clothing and underclothing as well as over the outer clothing. The color and solidity of the fabric are unimpaired by the agent, which dispenses with the use of live steam or steam under pressure."—Henri Labbe, *Bulletin De L'Academie De Medicine*, May 18, 1915. In *New York Medical Journal*.



The Sanitary Engineer.—S. G. Dixon, and B. F. Royer, Harrisburg, Pa. (*Journal A. M. A.*, October 30, 1915), point out the importance of the functions of the sanitary engineer in public health work. These include: the tracing of the sources of infection, and the installation of the necessary sanitary reforms, especially in epidemics, the investigation of water supplies and overseeing the construction of water works and sewage work and their supervision, the patrolling of the watersheds and the abating of all possible sources of pollution. This protection of the purity of the waters of the state is the fundamental work of the engineering division. Dixon and Royer describe the engineering organization of the Pennsylvania Health Department, probably the largest of the kind in this country and give a table showing the results of its work in the improvement of general sanitary conditions and especially the reduction of deaths from typhoid fever.



Modern Biologic Therapeutics.—The JOURNAL has received from the publishers, the Medical Department of the Lederle Antitoxin Laboratories, New York, a copy of "Modern Biologic Therapeutics," cloth binding, illustrated, price \$1.00, postpaid.

The general headings under which the discussion is grouped are the following: Historic Development of Immunology, Serum Therapy, Serum Diagnosis, Vaccines in Prophylaxis of Disease, Vaccines in Treatment of Disease, and

Culture Products. The book is well bound, printed on excellent paper, and profusely illustrated. The historical matter is interesting and the discussion of the use of biologic products in the treatment of disease while confessedly limited to those products prepared in the Lederle Laboratories, is nevertheless of much value as far as it goes.

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Nation-wide Baby Week, March 4-11, 1916.—The General Federation of Women's Clubs is calling upon the women of the clubs to help in holding a Nation-Wide Baby Week Campaign this spring. The Children's Bureau of the United States department of labor will coöperate in this campaign. The date chosen as most convenient for the majority of communities is March 4 to 11, 1916. Many communities, however, may not find this date convenient, and may wish to plan for an earlier or a later date, while others may have made plans already for a Baby Week at a different time. A Baby Week at any date may be held as part of the nation-wide movement.

The purpose of a Baby Week in a community is primarily educational; it is twofold: first, to give the parents of a community an opportunity of learning the facts with regard to the care of their babies; and second, to bring home to everyone in a community the importance of the babies, the facts relating to the babies of that especial community, and the need of permanent work for their welfare.

These purposes may be carried out in various ways: by newspaper and advertising publicity; by sermons; by meetings and entertainments; and by one or more of such activities as a program of daily events, an Infant Welfare Exhibit, a Baby Health Conference, plays, etc.

In planning a Baby Week two principal things should be remembered:

First: The Baby Week should be a community campaign. The Women's Club may take the initiative and suggest the holding of a Baby Week, but all other organizations, especially those interested in child welfare, should be asked to coöperate. One of the greatest benefits to be derived from Baby Week is the fact that it brings together many organizations in a community for a common aim.

Second: A Baby Week campaign should not be a temporary flurry and excitement. Definite

efforts should be made by follow-up work to have it lead to permanent good for the babies of the community.

Every community can, if it will, carry out some form of Baby Week campaign. The form taken, however, will necessarily vary greatly in different communities. A rural community will probably not wish to carry out the elaborate program necessary in a large city to reach all the people. It may also happen that many large cities may not be ready this year to carry on a program which will demand considerable expense and the constant labor of many people; but may be anxious nevertheless to bring the subject to the attention of the public in such a way as to achieve some substantial results.

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Neglect of Aids to Diagnosis.—According to a note in *The Hospital*, the medical profession in Germany, or rather that portion of it which is still engaged in civil practice, has apparently become less keen than usual on pathological specimens, and the number of throat swabs, blood tests, fluids for cytological diagnosis, and such like, sent to laboratories, has fallen very considerably of late. This fact has caused much uneasiness to the authorities, who regard such measures as of great importance in controlling epidemics of infectious disease and in securing early diagnosis of serious illness. It is interesting to note that it has been left to the Prefect of Police to notify the profession in Berlin, and to declare that however much the ranks of the medical men may be depleted by the demands of the army, the authorities cannot allow practitioners to neglect such important procedures.

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Tuberculosis and the Agriculturist.—"The death-rate from tuberculosis among agriculturists may be put at 106 per hundred thousand. In comparison with this the death-rate from tuberculosis among those engaged in cotton manufacture is 202; brass work, 279; copper work, 294; glass making, 295; earthenware, 333; cutlery, 382; file-making, 402. Other statistics might be given showing the same thing, namely, that tuberculosis is intimately associated with certain occupations, especially those giving rise to dust—metallic, mineral or organic." — *Bulletin*, Texas State Board of Health, for August.

Industrial Hygiene and Sanitation.

Examination of Employees.—The methods of physical examination and regeneration of employees that are used at the Youngstown Sheet and Tube Company are described by S. M. McCurdy, Youngstown, Ohio (*Journal A. M. A.*, Dec. 11, 1915). In his introductory remarks he gives a little of the history of this work in this country, of which Dr. W. I. Clark of The Norton Company, Worcester, Mass., is credited as the pioneer. This work has been undertaken at Youngstown during the past two years. There are about 8,000 men employed in heavy work in iron and steel manufactures and the employees are examined in detail as to their physical condition. A hospital has been opened for the quarantine and treatment of trachoma patients, who have been found to be somewhat of a problem. The patients were treated partly at the expense of the company and partly at the expense of the township trustees, and McCurdy thinks that careful inspection would find it a problem also elsewhere. They have gone beyond mere inspection in caring for their patients and have tried to eliminate all appearances of paternalism and the possible result, pauperism. They feel it better to have the afflicted pay all or part of the bill for medical care, though the money might be loaned to them by the company. Some patients unable to pay were placed, through the various charitable agencies, in the institutions suited to their cases. Economically, the problem is better for society if it can see the cost of the burden of the unfit than if the debt is concealed. If an industry pays an employee \$2 when his service is in reality worth but 50 cents, it appears to be giving in charity \$1.50; but in the last analysis the cost is somewhere charged in the expense of production, and the public pays for it in the higher cost of living. McCurdy sees no better way to mend matters than state insurance, which makes a man while well contribute toward the cost or care of society's infirm.

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Health Insurance.—The Standards and Tentative Draft of an Act on Health Insurance is submitted for criticism and discussion, by the Committee on Social Insurance of the American Association for Labor Legislation. The main

object of the act is the conservation of health, the prevention and treatment of sickness, also the providing of financial benefits. In drawing up this act, foreign precedents (namely, English and German) are followed, and compulsory insurance is advocated. Manual laborers, whatever their earnings, and other employees, mostly clerks and foremen, earning less than \$1,200 per annum, come under the act. Employees of municipalities are invited to constitute a special class to be included. Home workers and casuals would have to be dealt with separately or excluded, because their contributions are so scattered and few, that a proper basis for benefits could not be formed. Voluntarily insured persons have the right to enter the compulsory mutual associations, and so to participate in their benefits and management.

The benefits include: medical, surgical, and nursing attendance; medicines and surgical supplies; cash benefits; maternity benefits; funeral benefits; medical and surgical attendance and medicines for dependent members of their families.

The insurance is to be managed by a mutual organization of employers and employees, under the supervision of the state. The pecuniary burden will be shared by all—the share of the state is one fifth, while the rest is divided between the employers and employees. No new burden will be imposed on the employees. It is estimated that about 4 per cent. of the income of the working class goes for the care of sickness or burial insurance—this would be about the percentage of wages required for all the benefits of this draft.

According to the secretary of this association:

"It is anticipated that this local organization of insurance will reveal any unusual rate of sickness in any one community or trade, and that the possibility of reducing insurance provisions with an improvement in public health will offer a financial inducement to reduce the sickness rate by active preventive measures. Moreover the local organization of the insurance makes it possible for the 'associations' to coöperate with the local health authorities."

New York State Industrial Accident Board Charged with Gross Neglect.—According to the *Survey* for December 11, neglect by the present industrial Commission of New York state, similar neglect by its predecessor, the Industrial Board, inefficiency on the part of its chief inspector, delay by its counsel, failure to inspect factories and to secure compliance with the violations issued against buildings are the outstanding charges of the coroner's jury which held an inquest over the Williamsburg fire which took twelve lives on November 6.

The findings, which have been filed with Governor Whitman, are as follows:

"1. We find the Industrial Commission inefficient and guilty of neglect because of their failure to enact proper rules or regulations to safeguard the people who are employed in factories of five stories in height.

"2. We find the former Industrial Board of the Department of Labor was guilty of gross neglect because of their failure to enact proper rules or regulations from April 7, 1914, to May 1, 1915, to safeguard the people who are employed in factories five stories in height.

"3. We find Jeremiah J. Flood, the chief inspector, is ignorant of his duties, inefficient and unfit to occupy the position he holds.

"4. We find that the violations referred to by Counsel Frederick H. Cunningham, have not been properly and promptly prosecuted, especially those with reference to fire exits and fire-proof stairways.

"5. We find that at the end of the fiscal year 1915 in the first district, 10,650 factories were not inspected out of a total of 36,900; that out of 3,711 violations issued in the first district for the same period, relating to fireproofing of stairways in factories only 246 were complied with, and out of 4,589 violations issued with reference to additional means of exit, only 246 were complied with.

"6. We find that payments of about \$24,000 a year by the state for meals and hotel charges to the members of the Industrial Commission while in New York city and for meals for the inspector, supervising inspector and assistant chief inspectors in New York city, is unwarranted and should be prohibited."

Safety Instructions for Foremen.—Safety rules for workmen are posted in many factories and are printed in the company rule books, but less often is found a set of safety rules written especially for foremen.

Those issued for the foremen of the Norton Company are full of suggestions for application in other plants. These rules read:

1. Learn all safety rules for workmen. You will be held responsible for the enforcement of all these rules in your department.

2. When you hire a new man, you must explain to him all safety rules in connection with his work.

3. When you put a man onto a new class of work, thoroughly explain to him all safety rules in connection with his new work.

4. Watch all new men carefully and see that they take no unnecessary risks.

5. You are responsible for keeping in place all safeguards on the equipment in your department.

6. If a new machine is set up in your department, do not allow same to be started until you make sure that all gears and other dangerous parts are protected.

7. If a machine has been repaired, do not allow same to be started until guards have been replaced.

8. If a guard or safety device is out of order, do not use machine until it is repaired.

9. Keep all passages in your department clear at all times.

10. Examine frequently all belts in your department and see to it that they are under the proper tension, also that lacings are in good condition.

11. See to it that all overhead work, shaft-hangers, and so on in your department are kept rigidly secured.—*Factory*, December.

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The Personal Touch in Safety Work.—"All theories as to the method of teaching how to prevent accidents and educating the employee with a view to promoting the welfare of the employer as well as the employee, have value. Many persons have read largely along these lines and given their theories in valuable articles full of suggestions, while others have given their practical experiences. The latter are sterling, whether they are clothed in eloquence or in plain attire. But still we find a continued reaching

out for something new, something dependable upon which we can work with a surety of result and recommend as a basis for other employers. It has become apparent that mere devices for protection are inadequate and that teaching which confines the subject to first-aid to the injured and the Prone method of resuscitation, although essential, are not sufficient. Something more is needed to raise the standard, something that is not forgotten as soon as heard but is carried away as a live and sentient thing. It is not in my experience that anything new is required so much as something real. This means a departure from the perfunctory to the personal touch. Everything is now conducted on such a gigantic scale that the personal touch has been lost sight of, but, if any real progress is to be made, the workmen must first be recognized as individuals and heard with patience and sympathy. But if the employer is going to be interested, I must not continue on this line until I appeal to him from the practical, from the commercial side, else he will say, without stopping to think, "This is a 'slop-over.'" The employer has done a great deal, but he wants better results coöperatively. He is not satisfied, consequently, something is lacking. The employer needs education as well as the employee. Co-operation means harmony in every sense of the word. It does not mean just material benefits supplied. Speak to an employer on this subject and nine out of ten times, he will cite some case where an employee has proven ungrateful for benefits received. But, what does he really know about the case? Nothing. It is a cold-blooded proposition. The employee has the same faculties as the employer and, given the proper education, he will use these faculties for those who have raised him up to a higher standard, and both employer and employee will be benefited financially."—*Safety Engineering*, October, 1915.

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The Slipping Hazard.—In the district of Manhattan during 1914 there were more deaths from falls on stairs (102) and sidewalks (68) than there were from fires (65), subway (12), elevated (12) and surface (53) cars combined. Over half of the deaths due to falls on stairs and sidewalks were caused directly through slipping.

In New Jersey, in 1912, there were more deaths

from slipping than from any other single industrial hazard.

But in spite of these facts, the American Abrasive Metal Company believes, that the seriousness of the slipping hazard is *much greater*, because many accidents due directly to slipping are erroneously classified; as for instance:

A man carrying a pail of acid slipped on floor level spilling the contents of the pail over himself causing death. This accident was classified as "burned." An accident caused through a person slipping on an elevator floor landing when getting on or off an elevator car is not classified as a slipping accident but as "injured getting on and off elevator car."

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Effect of Fatigue on Industrial Output.—

"During the recent meeting of the British Association at Birmingham, the Economic Science and Statistical Section received and discussed an interim report of the committee, presided over by Professor Muirhead, which has been investigating the question of fatigue from the economic standpoint. The report contains some exceedingly important statistics and conclusions concerning the effects of fatigue upon the industrial output. The main tests used to ascertain the degree of fatigue in various classes of workers were the output of work and the frequency of accidents in the course of the work. Observations have been made in factories of several kinds with a view to ascertaining the variations in output and in the number of accidents during the hours of each spell of work, and the figures so obtained have been regarded as indices of the degree of fatigue. The results tabulated show that after the second hour there is a continuous and marked decrease in the output, and a corresponding increase in the frequency of accidents. One of the examples given is of the work done by operatives engaged in soldering tins in three factories. For the morning spell the average figures are: First hour, 114 tins; second hour, 167; third hour, 159; fourth hour, 157; fifth hour, 138. For the afternoon spell: First hour, 119; second hour, 165; third hour, 163; fourth hour, 155. All the tables agree in giving a higher output for the second hour than for the first, and this result is attributed to the facility which comes from practice. The chief point which the report drives home is that a factor which

alters the rate of production and also the accident rate is the hour of the spell rather than the hour of the day. The committee therefore suggest the desirability of breaking up the spells or continuous periods of work by periods of rest.

"Professor Muirhead, in introducing the report, emphasized the practical importance of the investigation. The statistics represented a vast economic loss, which most members of the committee were convinced could be avoided or reduced by a system of pauses or rests in the industrial day. The report inevitably emphasized the economic action of this loss, but the committee were profoundly conscious that there was another and more human side. The fact that in America it was estimated that something like 30,000 lives were annually sacrificed in in-

dustrial accidents, and something like 500,000 cases of serious injury occurred, demonstrated the great human import of the statistics. The committee had not been able to record the cumulative effects of fatigue from day to day and from week to week, but there was evidence that the physiological products of fatigue were not got rid of in the working day. That meant a growing predisposition to disease and mental excitement. It was suggested that certain kinds of social unrest were most reasonably interpreted as the accumulated results of a neglect of hygienic and humane conditions of labor, and it is only fair that this should be remembered in judging recent manifestations in some of our industrial centres."—*The Medical Officer*, London, October 9, 1915.

Legal Decisions.

The Harrison Antinarcotic Law.—*Held to be Constitutional by a United States District Court.*—The United States District Court for the Western District of Washington has decided that section 8 of the Harrison antinarcotic law is constitutional. This section provides that possession or control of the habit-forming drugs named in the act, by a person who has not registered and paid the special tax, is unlawful, and such possession or control is made presumptive evidence of a violation of the act.

The court said that the purpose of the act was to prohibit the importation, manufacture, or sale of opium and the other drugs included in the act, and that Congress had "the right to make it unlawful for any person who has not complied with the provisions of the act by registration or paying a tax, to have in his possession this 'outlawed' article."

The opinion is published in full at page 3631, December 10 issue of the Public Health Reports.



Garbage-Reduction Plant Not a Nuisance.—*The Supreme Court of Ohio Decides That a Legally Authorized and Properly Conducted Garbage-Reduction Plant is Not a Public Nuisance.*—A company which owned and operated a reduction plant for disposing of the garbage of the city of Toledo was indicted for maintaining a public nuisance. On the trial it appeared that

the contract between the city and the company was made under express legislative authority, that the plant was erected and operated under strict supervision by municipal officers, and that it was conducted with as little annoyance to persons in the vicinity as possible.

The jury found that offensive odors came from the plant, and the lower court took the view that it was a nuisance. A fine was imposed and the court ordered the nuisance abated. Compliance with this order would have necessitated the abandonment of the plant.

The Supreme Court of Ohio reversed the judgment, holding that as the plant was constructed and operated for the benefit of the public and by legislative authority, it could not be successfully prosecuted as a public nuisance. The court intimated, however, that if the work of reduction was done in such a way as to cause unnecessary disturbance or annoyance to persons in the vicinity damages might be recovered.



Physical Examination of School Children.—*A Judicial Decision Holding that School Boards May Require a Physician's Report as a Pre-requisite to Admission to School.*—For several years there has been in force in the schools of Aberdeen, S. D., a regulation requiring that each child seeking admission into the schools must furnish a "physical record card," signed by a

physician, giving certain information relative to the physical condition of the child. This report might be made by a physician employed by the parent, but if none was furnished the child was examined and the report made by the school physician.

The Supreme Court of South Dakota decided that the regulation was reasonable and valid, that it did not unlawfully bar any pupil from the schools, and that the school board had authority to adopt it. The opinion of the court is published in full at page 3361 of the November 12 issue of the Public Health Reports.

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City Must Care for Sewage—Individual Not Liable for Damage.—Though a city may control and regulate its sewers and the character of sewage which any property owner may discharge into the sewer, and though no property owner has a right to connect a private sewer with a city sewer without the city's consent, where a city board of health, with knowledge of the character of sewage from a distillery, ordered the person operating the distillery to make a connection with the city sewer, and he did so by the authority of the city and under the supervision of its engineering department, and the city did not by ordinance regulate the quantity or character of sewage which he was authorized to discharge into the sewer, it was thereafter the city's duty to

take care of the sewage, and the distillery proprietor was not liable to riparian owners for the pollution of a stream caused by emptying such sewage into the stream.—*Kraver et al.* (including city of Henderson, Ky.) v. *Smith*, 117 S. W. 286. —*Municipal Engineering*, December.

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The Disposal of Municipal Sewage.—*Damages Awarded Against a City Sewer District for Injury Caused by a Sewage-Disposal Plant.*—A sewer district in the city of El Dorado, Ark., constructed a septic tank for disposing of sewage. An owner of land near the septic tank brought suit for damages, alleging injury to his property.

It was proved that offensive odors emanated from the tank and that a stream which flowed through the plaintiff's land was polluted. The evidence showed, however, that much of the pollution of the stream was caused by unnecessary flushing of the tank.

The court held that the sewer district was liable for the amount by which the value of the plaintiff's land was depreciated by reason of the construction and operation of the septic tank, but that no damages could be recovered against the municipal authorities because of the acts of employees in unnecessarily flushing the tank.

The opinion is printed in full at page 3439 of the November 19 issue of the Public Health Reports.

Personal Notes.

Prof. C.-E. A. Winslow, who recently became Professor of Public Health at Yale University, severed his connection with the State Department of Health, November 30, 1915. Dr. Matthias Nicoll, Jr., of New York City has been appointed from the Civil Service list as his successor as director of the Division of Publicity and Education. Doctor Nicoll has been active in public health work in New York City and has been a constant worker in the Department of Health Laboratory, both in the diagnostic division and in the research division. He resigns his position as Director of the Diagnostic Division of the New York City Laboratory.

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The following persons were elected to membership in the American Public Health Association on December 10:

Charles Patterson Stahr, Board of Health Office, Lancaster, Pa. Secretary, Board of Health.

Dr. Francis J. Redmond, Fillmore, N. Y., Physician and health officer.

Joseph D. Page, P. O. Sans Bruit, Quebec, Canada. Medical Superintendent Immigration Hospital.

Frank M. Holcombe, Main St., Keeseville, N. Y. Physician, health officer.

John L. Tiffany, 170 William St., New York.

Joseph A. Lanahan, 161 Hamilton St., Albany, N. Y.

Nels Albin Nelson, Long Branch, N. J. Health Officer.

Geo. Philip Paul, 187 St. Botolph St., Boston. Physician and surgeon.

Arthur A. Eisenburg, 1708 Third St., N. W., Washington, D. C. Anatomist.

Emery Joseph Therrault, U. S. P. E. Service, Cincinnati, O. Chemist.

John T. Sprague, 514 Bay St., Stapleton, N. Y. Assistant, Sanitary Department.

Chalmers Jack MacKenzie, University of Saskatchewan, Saskatoon, Can. Professor of Civil and Sanitary Engineering.

Dr. Andrew Henderson, Powell River, Vancouver, B. C. Health officer.

Welcome Anson Hanor, 118 E. Erie Av., Corning, N. Y. Physician.

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Dr. R. W. Pryor has been appointed city bacteriologist of the Detroit Board of Health.

Doctor Pryor has been for the last five years assistant to Prof. Victor C. Vaughn of the University of Michigan.

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Dr. A. Veeder, a member of the American Public Health Association, and a writer on water-supply, garbage disposal and similar subjects, died at his home in Lyons, N. Y., on November 16. He was born in Ashtabula, Ohio, in 1848, and was graduated from Union College in 1870. He received his medical degree from the University of Buffalo several years later. For several years Doctor Veeder was principal of the Ives Seminary, Antwerp, N. Y. He had practiced medicine for the last thirty years in Lyons.

CURRENT PUBLIC HEALTH LITERATURE.

AMERICAN.

American Medicine.

X. October.

The Questionable Character of Much of Our Data on Cancer. Editorial.

The Subject of Infant Care. Editorial.

What Makes a City Healthful. Herman M. Biggs.

Boston Medical and Surgical Journal.

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Food Deficiency Diseases. Editorial.

Child Labor Legislation. Editorial.

Swimming Pool Sanitation. Editorial.

Canadian Medical Association Journal.

V. October.

Method of Dealing with Tuberculosis in Public Schools of Toronto. F. S. Minns.

Cleveland Medical Journal.

XIV. September.

Epidemiology of Whooping-Cough and Diphtheria in Cleveland in 1914. R. G. Perkins et al.

Interstate Medical Journal.

XXII. November.

Occupational Heart Disease. E. R. Hayhurst.

Journal of the American Medical Association.

LXV. November 13.

Elective Localization of Streptococci. E. C. Rosenow.

A Study of Immunity Following the Use of Typhoid Vaccines and Serobacterins. W. E. R. Schittstaedt.

The Localization of Streptococci. Editorial.

November 20.

The Relation of Rodent Plague to Human Infection. W. C. Rucker.

Infectious Diseases. Their Administrative Control in Different Cities of the United States. S. D. Hubbard.

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Some Interrelations of Diet and Milk Production. Editorial.

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PUBLIC HEALTH PUBLICITY: THE ART OF STIMULATING AND FOCUSING PUBLIC OPINION.

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I The Scope of Publicity.

PUBLICITY properly applied will save more lives than any other single agency employed by health workers. It should be entered in the Public Health Pharmacopœia as an accredited remedy for human ills. It is being applied to individuals in capsule doses of public health education. It is also being applied to masses of people over whole areas of country as public health agitation for far-reaching reforms and for needed new health laws or regulations and for the enforcement of laws already on the books.

Publicity prevents tuberculosis and builds hospitals to cure it; it saves the lives of children and controls epidemics of smallpox. Thousands of babies are today alive in New York State largely because big doses of publicity were administered to the public by the state and local departments of health, through exhibits, newspaper articles and lectures. One of the most important cities of that

state endured an epidemic of smallpox that increased for a year or more. Then the State Department of Health announced that its policy in dealing with epidemics would be state-wide publicity. When the people of that city realized that their low health standards were to be advertised broadcast through the pages of the newspapers and would come to the knowledge of the people of the whole state whose lives were being menaced, the city officials soon found merit in the program of the state.

Nine out of ten people think of newspapers when you say publicity. This indicates the importance of newspapers in a publicity campaign; it shows that most persons get their information on public questions from newspapers and look upon them as the most important publicity medium. As the title of these articles suggests, however, publicity is to be discussed with a much broader field in view.

THE FIELD OF PUBLICITY.

Publicity is actually any effort to make people think. It involves, besides newspapers, the use of exhibits, meetings, lectures, motion pictures, lantern slides, circular letters, pamphlets, reports, magazine articles, all forms of advertising including newspaper, billboard and placard, and last but not least, ordinary conversation.

Public health publicity is an effort either to change the lives and habits of the people or to focus or re-focus public opinion. The latter is often mis-called manufacturing sentiment or creating public opinion. There is no such thing as "manufacturing" public sentiment in health work. Public health opinion is founded upon the most fundamental and probably the most commonly recognized race instinct—self-preservation. There can be no two ways of thinking about saving life. There can be, and usually is, lack of thinking about it, however, and that is what the public health educator must overcome. He must get people to think and get them to think in the right way. He must stimulate and educate. He must agitate. Having stimulated and agitated he must then focus the interest of the people in health preservation, in sanitation and hygiene as means of prolonging life and adding to its enjoyment.

CREATING OR STIMULATING OPINION?

The public is a collection of individuals. Public opinion is merely individual opinion in the mass. Public opinion is seldom recognized except

when in motion. Setting it in motion is not creating it. There is of course such a thing as "manufactured sentiment," but not in health work. It is often necessary to "create" sentiment in certain fields of political activity. Sentiment for or against protective tariff does not exist until the tariff is discussed and those in favor of it fall away from the free traders, and the two groups form parties based on opinion. A hundred-million-dollar appropriation does not exist in public opinion until it is talked about and the need for the roads, the canal or the what-not is presented to the people. But with these the thought is put into the minds of the people. Human beings are not born with an instinct for a protective tariff or good roads or canals.

When the question is life or death, sickness or health, however, we are dealing with an entirely different psychological factor. Here we have a race instinct that needs only to be aroused and focused to be effective in securing action, either individual or collective. There may be cleavages of sentiment and divisions of opinion as to methods but there can be no differences as to the basic race urge toward life preservation.

There may be different opinions as to the amount of money to be appropriated for a given public health activity or as to the governmental unit to assume a public health burden but no difference of opinion can exist as to the desirability of saving life and preventing sickness. That question was settled when our ancestors were being chased over lava lakes by pre-

historic monsters. Our desire to escape a deadly micro-coccus is no less keen than was that of our ancestors to outwit the monstrous diplococcus.

One group in the community may honestly believe that a cavity in a lung is a mental error and not a hole. But all would want to heal all lungs with cavities in them and all would want to prevent everyone from getting the disease that caused them. One group might want to kill the germs that caused these by not thinking of them and not admitting their existence. The public health group, however, knows that germs do exist and it knows also that few if any germs have ever died from broken heart from being forgotten. Even the Christian Scientist, though, is as

active in responding to the self-preservation urge, as the most ardent believer in the germ theory. If the Christian Scientists become dominant their public health campaign will be an effort to make people forget. Our present public health publicity, however, is to make them think.

HOW TO GO ABOUT IT.

Then how are we, as leaders, to make people think, to make them feel the fundamental race urge and to get them to act, individually and collectively through their agents in office?

First: By establishing our authority, our right to express an opinion as to the proper means of saving life and preventing sickness.



It required careful planning and well-worked out publicity to make this meeting of school children at the Syracuse State Armory an effective part of the tuberculosis campaign.

Second: By talking in as forcible language as possible and in as many ways as possible and to as many persons as possible.

Now there is no such division, as the above, either real or imaginary, in the execution of a public health publicity campaign. Assuming a sound scientific basis for a health movement, a department or an association officered and sponsored by persons whose reputations carry popular conviction, our very efforts to focus public opinion will establish our right to speak and our authority in the health field. The only way to establish the soundness of an opinion or a theory, so far as popular action is concerned, is to get the people to accept it. It is possible to establish authority even for error though fortunately such seldom persists. There may be objection to this but does anyone deny that Lydia Pinkham's vegetable compound has the active support of a considerable public opinion? Doctor Friedman won public opinion and succeeded for a time in his appeals to the instinct of self-preservation in the poor consumptive.

TRUTH IN PUBLICITY.

We must base our campaigns, then, if we are to succeed permanently, on scientific accuracy. Anything short of that is wasted effort if not actual fraud. I am not going to take much space, however, arguing for truth in publicity. I believe that I am safe in assuming that the fundamental virtues are as generally accepted and acted upon by public health workers

as by other groups in our social fabric. When one argues for truth and scientific accuracy in publicity he is merely arguing for the employment of sound publicity method. The fakir may move the public but when the fake is discovered the fakir must move. When people discovered that mosquitoes and not miasma from swamps spread malaria the advocates of the miasma theory lost their authority. Publicity skill can never make a fake permanently hold a place in public opinion any more than a Raphael could paint a picture on a hole in a canvas.

And isn't that about all there is to it? If we are to retain our authority and be able to fill the first part of our bill we must urge public and individual action upon scientifically accurate statements that will work out. Truth in publicity is a part of wisdom.

The spectacular temporary successes of skillful publicity for absolute fraud in medicine and even in public health work show strikingly what may be accomplished by employing the correct publicity method and technique. Many an honest man has permitted the charlatan to monopolize the field of publicity. It should be remembered, however, that even a fakir may employ true *method*. Would an honest artisan be wise in not using a hammer because a burglar also uses that implement? Publicity dynamite is often employed by the assassins of truth but it is nevertheless mightily effective in blasting out the rocks of ignorance and indifference from the channel of social progress.

THE JOB OF THE TRAIL BLAZER.

Now to go back a bit. To get the publicity usufruct from a sound theory you must get the people to accept it. A theory may be sound and yet the public may scorn it. Columbus had considerable difficulty with his theories. Pasteur was put to it to convince wine growers and silk worm culturists that bacteria were causing their troubles. The theories of these two trail blazers were as sound before they were accepted as now when the whole world is enjoying the fruits of their persistence. All trail blazers must secure a following or their pioneering is useless. And that is about the job of health officers or health associations—to establish authority as leaders and to base their calls for followings upon that authority.

Assuming, then, a sound scientific basis for a given health movement our problem becomes this: how may we inform our potential following of our authoritative position in the health field; and then, further, how may we so direct their opinions and energies that lives may be saved and that sickness may be prevented.

ACCELERATING PUBLIC OPINION.

When a certain lobbyist of notorious corporation connection announced on the witness stand a few years ago that his work had been that of "accelerating public opinion," the phrase was immediately taken up by the newspapers and became the subject of many highly critical editorials. The character of the work of that particular accelerator had been such that his as-

sociation with his own phrase-child spoiled it for a time for legitimate use. Faulty environment is as bad for a phrase as for a child. Publicity has suffered from a most disagreeable environment. "Accelerating Public Opinion" is one of the most suggestive phrases in the English language and one that could be analyzed with profit by every public health worker. If this series can rescue the rhetorical waif and supply a better environment these articles will not have been written in vain.

Every person seeking to reach the public through the printed page or through the spoken word is an accelerator of public opinion. He may be accelerating it in the direction of advanced thought on public questions, or he may be accelerating it in the direction of so-called "conservatism." One is conducive to progress and the other to retardation. It is all acceleration of public opinion, however. It is moving public opinion in masses.

THE PROBLEM OF THE MERCHANDISER.

If our problem is to change the lives and habits of the people, to overcome individual indifference and to stimulate individual and collective action, it is identical with that of the marketer of merchandise. Every merchandiser is an accelerator of public opinion. It is his job to move opinion—usually individual opinion—in the direction of his particular article of commerce.

Take for example a man putting on the market a new brand of baked beans. To pay a dividend he must secure a national market for his beans. The profit that repays his efforts is

WILL YOU VOTE YES OR NO TO SAVE LIVES?

**304 Persons Died from Tuberculosis in Jefferson County During
the Last Five Years**

YES ☒ SHALL THE COUNTY OF JEFFERSON APPROPRIATE THE SUM OF \$25,000 AD-
NO ☐ DITIONAL FOR THE ESTABLISHMENT OF A COUNTY TUBERCULOSIS HOSPITAL?

YES MEANS

1. That you want to save the lives of the hundreds who are sick and dying from tuberculosis in this county.
2. That you want workers saved to industry—wage earners saved to their families—mothers saved to their children.
3. That you want to give the well—especially the children—the best possible protection against consumption by caring for the sick in a place where they will want to stay and where they cannot spread infection.
4. That you want this county to decrease the number of orphans and lessen the amount of poverty by taking the same step that 26 other counties have already taken.

ALL VOTERS (not merely taxpayers) may on Election Day, November 2d, declare their attitude toward stricken humanity.



This is how 26 counties are caring for their tubercular sick

NO MEANS

1. That you are not willing to do what you can to prevent deaths from consumption.
2. That you are indifferent to the costly burden which consumption now places on this county in preventable deaths, sickness, child dependency, and poverty.
3. That you vote for sickness, neglect and death, instead of health, scientific care and the saving of lives.
4. That you are willing to let this county lag behind the 26 which have already decided this question of humanity in the affirmative.

Mark your small hospital ballot before you leave the booth!

JEFFERSON COUNTY HOSPITAL CAMPAIGN COMMITTEE: Mr. T. W. Sackett, Cape Vincent, Chairman; Mr. Francis H. Lamon, Watertown, Secretary

Six column, 11-inch advertisement published in 49 newspapers in five counties in the county tuberculosis hospital referendum campaign in New York State. This advertisement reached 88,000 persons twice, and its arguments were in a large measure responsible for a favorable total majority in the five counties of 20,825 votes. There was a larger total vote in three counties on the hospital question than was polled by the chief candidate on the regular ticket. The cost of this advertising in the five counties was approximately \$660.00. A circular letter going to a list of 88,000 only once, would cost \$3,520 without an enclosure. With an enclosure the cost would be \$4,200; twice with an enclosure would cost \$8,400 as against \$660—the cost of the advertising.

dependent almost entirely upon the amount of money spent and the intelligence displayed in his efforts to accelerate public opinion in the direction of his particular brand. He is not trying to move people in masses, but merely to convince individuals, that his particular brand of beans is a better brand than has ever been put on the market. His problem is almost exactly the same as that of the

health department that must convince individuals that fresh air, good food, personal hygiene, vaccination, inoculation against typhoid and the use of antitoxin will aid in prolonging their lives.

The bean man must establish his authority as a manufacturer of baked beans. The health worker must establish his right to give advice. The bean man secures purchasers for his

beans. The health man secures action on his advice.

MASS OPINION IN MERCHANDISING.

Consider for a moment, however, the man who has invented a process of manufacturing an entirely new article of food—let us say bean butter. He has found that ground beans and olive oil are so superior to the ordinary bean product that he believes he can make it a national institution much as baked beans are a New England institution.

Here we have an entirely different problem. The inventor of the new food must accelerate public opinion almost to the point of securing mass action. He must cause his bean butter to be discussed in the magazines, on the lecture platform, in women's clubs, and make it the subject of conversation in households all over the country. All his efforts, of course, are directed ultimately to bringing about the purchase of his bean butter by large numbers of individuals. He must, however, accelerate mass opinion and not merely individual opinion, as in the case of baked beans. This is called an educational campaign in commercial advertising.

The bean man must force his bean butter idea into the thought of the people. The health worker, with compulsory vaccination, the use of diphtheria antitoxin, the need for advanced health legislation or adequate appropriations as his problems, is not compelled to force in a new idea. He must merely stimulate the self-preservation instinct, and focus it on the proper means of meeting its demand.

PUBLICITY AS AN ART.

The two merchandising problems are as old as modern business. The solution of them has become an art. Mercantile publicity has indeed become such a highly developed and highly specialized art that many advertising experts insist that it has approached, if not actually reached, the realm of science. It certainly is true that many of the principles of mercantile publicity have been so thoroughly established by long practice that at the present time experimentation in advertising is rare.

Social service publicity, though, is in its infancy, relatively. For years, of course, more or less sporadic efforts to secure newspaper notice have been made by public health men and social service workers. With the rapid development of social service activities and the tremendous increase in the number of organizations clamoring for public notice, it behooves all of us to waste no time in experimentation where publicity principles have been established by a considerable experience.

There is little place today in the field of social service acceleration for the amateur publicist. He damages not only his own cause but gets in the way of traffic and makes it more difficult for even the skilful to succeed. The amateur who finds himself confronted with some problem of social service acceleration will advance his own cause and do less damage to the whole cause of social reform if he applies to his work the well established principles of publicity calls into play



Public health education in the home. A tuberculosis visiting nurse instructing a patient.

all the judgment at his command. Every social service campaign should receive as careful consideration as is given to a merchandising campaign.

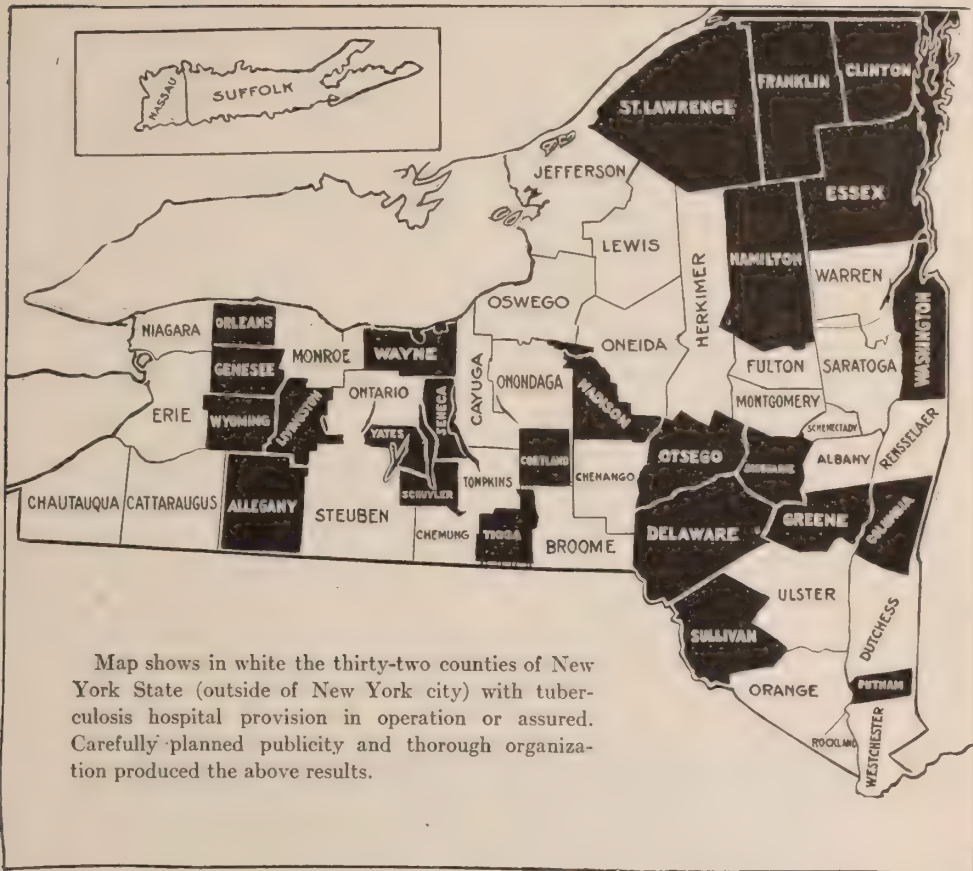
Most of us are familiar, some from dire personal experience and others from observation, with public reaction, that sword of Damocles, which threatens all social service effort. Practically every instance of public reaction against a social reform is traceable to ill-considered publicity campaigns and faulty publicity method. The amateur wants to stampede something. A stampede is easily started. It seldom produces anything but disaster. Too many social service publicity campaigns try to start a stampede. Such attempts are either abortive, and injure, more or less seriously, the whole field of social service work, or they are

too successful to result in real, constructive, lasting reform. Many "reform movements" are founded on sociological or economic error, and fail. This series is not a guide to social reformers nor a hand book for amateur philanthropists. It assumes merit and tries to show how to secure its recognition.

In public health work, which is comparatively new, it is important to recognize and practice the established principles of public opinion acceleration. It is possible for those of us in active health work to avoid the pitfalls into which other social service workers have fallen.

WHAT IS AN AGITATOR?

Let us begin by not being frightened by the English language. Let us



Map shows in white the thirty-two counties of New York State (outside of New York city) with tuberculosis hospital provision in operation or assured. Carefully planned publicity and thorough organization produced the above results.

recognize that if we are to be successful in the field of public health publicity we must be successful agitators. Against the advice of numerous friends whose judgment I value, I have adopted, as descriptive of my own work, the title "agitator." I believe that it is the most apt word in the English language to describe the work of a publicist. The term has fallen into disrepute because of its association with unsuccessful or faultily conceived efforts to accelerate public opinion. An agitator is merely that which, or one who, stirs things up.

We all know the "perfectly good" citizen who is always on the right side of public questions, who always votes against the "machine," and who signs petitions and writes occasional letters to the mayor, the governor or the legislature urging good things in politics and reform.

Some day, this good citizen may realize that his duty is not merely to be a "good" citizen; that in order to be a citizen in the best sense he must try to convince others to vote with him for the men representing the principles that he stands for, and to get other

citizens to think on public questions as he does. He may then become the "pro Bono Publico" who writes volumes of letters to the newspapers, unread except by the long-suffering editor; or he may become a real force in the community, through the practice of intelligent methods of focusing public opinion. The moment his efforts become effective in swaying the opinions of his fellow citizens he becomes an agitator.

All that is necessary to become an agitator is to begin to stir things up. It makes no difference whether you agitate from the head of a barrel on the street corner or agitate through news, editorial and advertising columns. You are an agitator just as soon as you begin to try to change the opinions of

the people on any given subject, whether it be pickles or public health.

PROFESSIONAL AGITATORS.

If you are extraordinarily successful as a private citizen in your chosen field of agitation, groups of your fellow citizens may decide that your services are so valuable to the public that they want you to devote your entire time to the job of accelerating public opinion. They collect private funds or secure your appointment to a public post so that you may make agitation your main job. Then you immediately become a "professional agitator."

"Professional agitator" is one who is stirring up public opinion and focusing it on a cause that he and a group of his fellow citizens consider good, and is getting paid for doing the work.



"Brass band methods" of publicity in the tuberculosis campaign have been criticized but this particular band filled a large state armory with people who listened to addresses on tuberculosis.

Among professional agitators, by vocation or avocation, are ministers, school teachers, peace advocates, presidents, governors, legislators and other politicians.

Stimulation of public opinion is a profession. The development of the printing art and the popularization of newspapers; the development of advertising, motion pictures and of the Chautauqua, and the lyceum lecture business has put a new aspect on the business of acceleration, even in the political field.

The importance of the profession has grown with the improvement in means of human communication. Today newspapers, telephone, telegraph and improved transportation, have made it possible to talk to millions in a day where in the early days hundreds might have been reached in a week, from the stump. Old publicity methods are disappearing and those who cling to them are disappearing with them. The torchlight procession has almost gone from political campaigns. The platitudinous cart-tail orator is going out of business. The hard-fisted, table-banging, bull-necked boss is no longer an effective vote-getter. His publicity value is chiefly as a witness at his own trial. The party that wins today wins by a few well-organized, carefully planned political meetings at which men who can really discuss the issues do the talking; by intelligently prepared newspaper advertising; by billboard pronouncements and the direct appeal to the voter through business-like circular letters. The same is true of public health publicity.

AN EXAMPLE OF THE OLD AND NEW IN AGITATION.

One man in New York State recently set out to defeat the constitution. Others were trying it by scattered fire and antiquated, ineffective methods. His work was one of the largest factors in accomplishing its defeat—desirable or undesirable as it may have been. He spent some \$50,000 or \$75,000 in newspaper advertising and nullified the several hundreds of thousands that the taxpayers of the state had spent on the election and the convention that framed the document. If the state itself, or if the group of high-minded citizens who at great personal sacrifice were urging the adoption of the constitution, had recognized the necessity for the application of present-day publicity method, the result might have been far different. The time has passed when a cause will win merely from the force of the character of the men advocating it. Method and not personality wins.

The professional man is slowest to recognize need for new methods and adopt them. To maintain his standing the professional man must be conservative as to professional matters. But physicians in public health work must recognize the fact that the "public" part of the work removes it in many respects from the realm of medical practice into a realm where a different order prevails. In this new realm a new profession has been rapidly developing methods and standards that are fully as important as those which we all venerate in the medical profession. The man who clings to

preconceived notions as to publicity and fails to recognize its principles and practice its technique simply cannot function as a public health worker, except in the laboratory.

This is the real reason why, every year, we see an increasing number of old departments passing into the limbo of the forgotten while their places are being taken by departments re-organized for real public health work—with the public accented.

The author of this series is not striving to become the Billy Sunday of public health publicity. No one will be invited to hit the publicity trail and enjoy the heaven of perpetual public approval. He purposes to draw upon ten years of active newspaper and publicity work and five years of experience in social service acceleration and hopes that where he failed you may win—where he made big blunders you may make little ones or none at all.



TYPHOID FEVER REDUCED IN RURAL COMMUNITIES.

Reduction in typhoid fever and improvement in sanitary conditions have followed the intensive investigations of rural communities carried on by the United States Public Health Service in coöperation with local and state health officers, according to the annual report of the Surgeon General of that Service. During the past fiscal year 16,369 homes in eight different states were visited and many of them re-visited. In each of these homes information was obtained as to the prevalence of disease and insanitary conditions and a complete sanitary survey of the premises conducted. This was followed by reinspections to determine if remedial measures had been instituted. In but a relatively small percentage of the cases did the persons concerned, after having their attention drawn to the danger of a particular unhygienic condition, fail to inaugurate corrective measures. Stimulus was given to the work by means of public lectures, the formation of active sanitary organizations, and the enlisting of all public-spirited citizens in the campaigns for reform. Public buildings were also inspected and local authorities given expert advice in solving such sanitary problems as the disposal of excreta, the prevention of soil pollution, and the maintenance of pure water supplies.

The surveys made during the year 1914 had shown that in rural communities less than 1

per cent. of the homes had sanitary toilets and that more than 50 per cent. of the people were using water from polluted sources. This condition, according to the Public Health Service, made the rural sanitation question loom large among the matters vitally affecting the welfare of the nation. Following these studies and as a result of the interest aroused, the typhoid fever rate, an excellent indicator of the sanitary status of a community, has in some places frequently been cut to one quarter of its previous figure. In Berkeley County, West Virginia, the cases of typhoid fever were reduced from 249 to 40 in one year. In Orange County, North Carolina, the rural sanitation campaign resulted in a reduction of the cases from 59 to 17.

The tangible results of operations in rural sanitation indicate that marked advancement in maintaining hygienic and satisfactory surroundings in country districts is possible by the application of the common principles of preventive medicine. Insanitary conditions exist largely because they are not known to be such. Actual demonstrations of their harmfulness, together with definite recommendations for their correction, remain one of the most gratifying and successful methods for instituting reforms and has been, in the experience of the Public Health Service, invariably accompanied by definite and measurable results.

THE VALUE OF A CREDIT BALANCE IN PUBLIC HEALTH ADMINISTRATION.

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WHEN one recalls the statement made by Ruskin many years ago, that "any interference which tends to reform and protect the health of the masses is viewed by them as an unwarranted interference with their vested rights in inevitable disease and death," one's sympathy at once goes out to a people so primitive and so superstitious; but after a brief introspection we might with advantage conserve some of our sympathies until we have, in the light of present knowledge, analyzed more carefully present methods of public health administration, and then decide how far we are removed, what advances we have made.

Preventive medicine has dragged its slow length along down through the centuries. Many of the advances under the Mosaic and Roman dispensation were submerged through ignorance and suspicion until the discovery and acceptance of the germ origin of disease, and its progress even since then reflects but little credit on its exponents. It is true that we have had sporadic outbursts of enthusiasm, when some new scientific discovery has been made: When Jenner perfected his vaccine we were enabled to control smallpox; when Pasteur perfected his prevention for rabies; and when Lister introduced the principles of antiseptic surgery, over half a century ago, notwithstanding the indis-

putable evidence this contained of the possibilities of controlling the transmission of infection, nearly half a century elapsed before the medical profession woke up the fact that the same principles were applicable to medicine; and I presume if it had not been for our esteemed and worthy chairman, Doctor Chapin, and his co-workers, some of us might still have been slumbering in this respect.

Later on, through the united research of Laveran of France, Sir Patrick Manson and Sir Ronald Ross in Great Britain, and Reed and his colleagues on this continent, it has been made possible to practically exterminate malaria and yellow fever. In this connection, as an illustration of what a statesman can do in the field of prevention, one recalls the experience of Mr. Walter Long, who, when Chief of the Local Government Board, succeeded in having a muzzling order enforced—eighteen years ago in Great Britain—since which time there has not been one case of hydrophobia in either man or dog throughout the whole United Kingdom. Long was the type of a statesman who could stand firm against a withering fire of criticism and abuse.

During the intervals of these scientific discoveries what have the administrators of public health been doing? Have many departments of health not been wasting valuable time, energy

and money in the collecting and disposal of garbage, street cleaning, plumbing and drain inspection, the abatement of nuisances, etc., problems that have little or no direct bearing on the cause or prevention of disease? It is true that many departments of health have relieved themselves of these unnecessary burdens. Why should administrators of public health be burdened with these administrations and have the expense connected therewith charged up against public health administration, thereby materially diminishing our credit balance? Obviously, street cleaning and garbage disposal should be under a separate department of civic administration; plumbing, etc. under the architect's department; and sewage disposal and water purification are engineering problems and should be under the works department. However, the supervision of installation and the efficiency of administration of both the sewage disposal and water purification should be determined by the laboratories of the Department of Public Health.

A careful consideration of these duties is imperative in view of the fact that the inadequacy of public health administration in many states, provinces and cities is due to insufficient appropriation. Have we not been doing many things that we might well have left undone, and neglecting many of the real issues in our administration? And while much has been accomplished, yet, for the most part the appalling sacrifice still goes on. We meet in these Conferences year after year, become enthusiastic as we exchange ideas with our colleagues, but

do we take this enthusiasm home? Does it cause us to speed up throughout the year? Are we preventing these preventable diseases? What are we doing to enlighten the public and to awaken them to a sense of their duty? It is not the epidemics we control but the epidemics that we prevent that help to give us a credit balance at the end of the year.

Unfortunately, from time immemorial—whether it be in the slums, where oft times we find the landlords extracting blood money with a personality even smaller and more contemptible than are the habitations the slum dwellers are forced to occupy, or in the various industries—in fact almost at every turn we find in blazoned letters “man’s inhumanity to man.” But, fortunately, the tide is turning. As one of your governors of a state recently said in a public address—“The expense to the nation from deaths that never should have occurred, has been calculated as eight times the loss from flood and fire. Should the prevention of this loss be in politics?” Continuing, he said, “We are going to realize that this is a new era, an era in which humanity stands before property; the political wall is growing lower and regard for human rights is growing higher.”

A prerequisite to advancement in preventive medicine is an absolute divorcing of public health work from politics. That this may be accomplished, we require more statesmen and fewer politicians. There have been statesmen in all ages and in all nations who have had visions of the future of preventive medicine that are

only now beginning to be realized. An enormous amount of money has been spent by our governments yearly in agriculture and stock because they have a monetary value. It is, therefore, given to us to demonstrate that human life and human efficiency have a monetary value, and that no nation can afford, from this standpoint alone, to disregard it. While students of political economy, both on this continent and in Europe, have differed somewhat in estimating the value of human life and human efficiency, yet this has been more in methods of reckoning than otherwise.

It has been conservatively estimated that preventable diseases and death cost the United States and Canada annually from one and one-half to two billion dollars. This is based on the very conservative value of a human life being placed at \$2,900, though our courts place this valuation at \$5,000. Time will not permit of my entering into detail in regard to this, but I would advise those who are not familiar with these details to read the valuable report prepared by Prof. Irwin Fisher, together with the authors therein referred to, the careful perusal of which will amply repay you.

Sir Thomas Oliver, in an address on "Dust and Fumes as Foes of Industrial Life," before the Congress of Hygiene and Demography, pointed out that the aggregate cost of illness due to occupation alone in the United States amounts to \$772,892,860 per annum; and this is for the most part preventable, but will not be prevented until our legislative bodies realize that the people, and the physical and

mental fitness of the people, represent the most valuable asset of the nation or municipality. In fact they constitute the very basis of economic productivity, but unfortunately this is being exploited in consequence of our ever increasing industrialism and the urbanization of our people. Yet, we were told years ago by Pasteur that it is within our possibilities to rid ourselves of all parasitic diseases, and we have reason to believe that with a proper and intelligent application of the knowledge we now possess that human life could be lengthened from fifteen to twenty years.

What are we doing to stem the tide? What are we doing intelligently to apply the knowledge we now possess to postpone old age; to prevent premature hardening of the arteries, that is dependent in a measure at least on auto-intoxication resulting from defective metabolism, due in a large measure to unnecessary worry and over-feeding, instead of regulating the fuel to the failing capabilities of the engine?

What are we doing to combat undue fatigue and minor ailments, the conditions that give rise to the familiar expressions—"I don't feel very fit"; "I am out of sorts"; "I'm on the rocks"? All these mean lowered resisting powers, increased susceptibility and probably 10 per cent. of a loss in efficiency and in labor.

What are we doing to control industrial diseases? This is probably one of the most lamentable, neglected branches of preventive medicine. It must be apparent that industrial hygiene is an essential part of the com-

munity hygiene and therefore comes under the régime of the Department of Public Health.

The term "industrial disease" as we use it embraces the results of the general unhygienic conditions in factories, work-houses, warehouses—badly lighted, over-heated, improperly ventilated and oft times with a dust-laden atmosphere; and for obvious reasons trade dusts are much more dangerous when inhaled than is the ordinary dust of the street. All these tend to lower the vitality and, therefore, lower the resisting powers of the body, thereby rendering the individual an easy prey to infection which he may be exposed to by close contact with possibly one suffering from tuberculosis or one convalescing from some other communicable disease, or perhaps a chronic carrier of one of the most common communicable diseases.

Under these circumstances one has little chance for escape. On the other hand such environments only hasten on a fatal issue with those unfortunates who are already the victims of some of the aforesaid diseases, and who, through ignorance of their conditions or the danger of their environment, or through dint of circumstances, are compelled to face the inevitable.

Secondly, we have the morbid state consequent upon the occupation or trade giving rise to these specific diseases. This I shall not dwell upon, as the subject is being handled in another paper on the program. It has been estimated that at least 50 per cent. of the occupied that die might be saved by the adoption of proper sanitary measures and proper

safety devices. Well might we be asked by the enlightened public—"If these conditions are preventable, why not prevent"?

What are we doing to control the ravages of venereal diseases? This is another lamentable, neglected field of preventive medicine. It is the opinion of investigators and those who are competent to judge, that venereal diseases constitute probably the most important of all factors in the degeneration and depopulation of the world. As Wilson expresses it in speaking of these diseases—"The intelligent and the stupid; the moral, immoral and unmoral; the innocent and the guilty are paying the penalty of centuries of an ignorant, ill-considered, false modesty, in terms of morbidity and mortality that probably surpass the amount of all other communicable influences combined."

If a computation were made of the acute venereal affections and their sequelæ—the brain and cord lesions; the insanities and idiocies; the inherited and acquired deformities; the destructive lesions, the partially and totally blind, the abortions; the still-births; all the abdominal operations on the innocent and the guilty,—the findings would be appalling. These constitute only a few of the points by which social diseases impinge both on the innocent and the guilty portions of society.

What venereal diseases represent in the lower working efficiency of our population, to say nothing of the still more important subject of an increased mortality, it would be difficult to estimate; and yet, the feature which casts the most reflection upon

our intelligence is that these diseases are preventable and yet practically no effort is being made to prevent them. In my judgment, if departments of health are going to handle these problems efficiently they must be entirely divorced from the social aspects and treated as any other communicable and preventive disease.

What are we doing to control the enormous increase of our insane? What are we doing to relieve this continent of the stigma of being dubbed "the home of the neurasthenic—the home of the neurosthniæ"? To what extent are these conditions responsible for the lamentable increase of insanity?

Sir James Crichton Brown in an address some four years ago made the following statement: "The broad fact remains that the number of registered lunatics has marvellously increased and is still increasing. The explanation of this is, from any point of view, to be found in the strain and stress of the age in which we live. It will not be disputed that during the last century the possible causes of nervous disturbances have increased prodigiously.

"The tendency of civilization has been to transfer the burden of bread-winners for the masses of the people from the muscles to the nerves. In the era of competitive business the victory is now to the vivid and to the nervous, not to the stalwart or the brawny. The introduction of machinery into every branch of industry has made life at once more monotonous and irritating, and in some industries the policy of 'speeding-up' has been adopted with increased closer work and fewer intervals of rest, and is,

therefore, peculiarly exacting and exhausting.

"The diffusion of education has widened the periphery from which stimuli of every kind may reach the brain. In response to our ever-shifting kaleidoscopic surroundings, we have become more fretful, mercurial, wayward and impulsive than we used to be, and suffer more from what may be called 'brain-fidgets.' It is certain that we are more 'jumpy' than we used to be; have to be more on the alert and so make sharper demands on our nerves, and are prone to those nervous breakdowns that lead up to mental disorder.

"We have been crowding our people into towns where hustling and nervous agitation are inevitable. We have been bringing up our babies on anything but mother's milk, and by the employment of women in many industries, have curtailed that family life in which the young nervous child best gains and thrives. We have been cultivating emotionalism and eagerly pursuing all kinds of pleasurable excitement, while we have narrowed our horizon and lost sight of some of those ideals that helped in the past to maintain a nervous and mental equilibrium. Notwithstanding all our improved economic conditions, we have not yet, as regards the nervous system, succeeded in reconciling modern civilization with biological processes. It is of course only by further economic social, sanitary and ethical reforms that the great nervousness of our age is to be abated."

These statements were well borne out by Dr. F. W. Mott, Pathologist of

the London County Asylum, in an address delivered before the Royal Sanitary Institute, in which he said: "A neurophatic heredity is the most important cause of insanity." This surely affords another fruitful field for educative work in preventive medicine.

What are we doing to control the ravages of cancer? It is estimated that over 80,000 lives are sacrificed annually in the United States and Canada by ravages of this dread disease, and yet from 50 to 75, or even a higher per cent. of these lives might have been saved by early diagnosis, early treatment, or by operating, if possible, in the pre-cancer stage. Inasmuch as it is the duty of administrators of public health to educate the public on all matters pertaining to prevention, the control of this dread disease obviously comes under the régime of the department of health. After the age of 35 or 40 it plays a very much more serious rôle than does tuberculosis.

Can we longer afford to disregard these problems? Are we guardians of public health awake to our ever-increasing responsibilities?

I have endeavored in the foregoing to draw attention to what in my judgment constitute the rocks and shoals upon which tens of thousands of lives are being mentally, morally and physically shipwrecked every year and upon which we are expected to place the beacon lights.

Is our shortage of appropriation which we so much deplore, the fault of our municipal government or the ratepayer, or have we failed in our methods of presenting our case? Have we

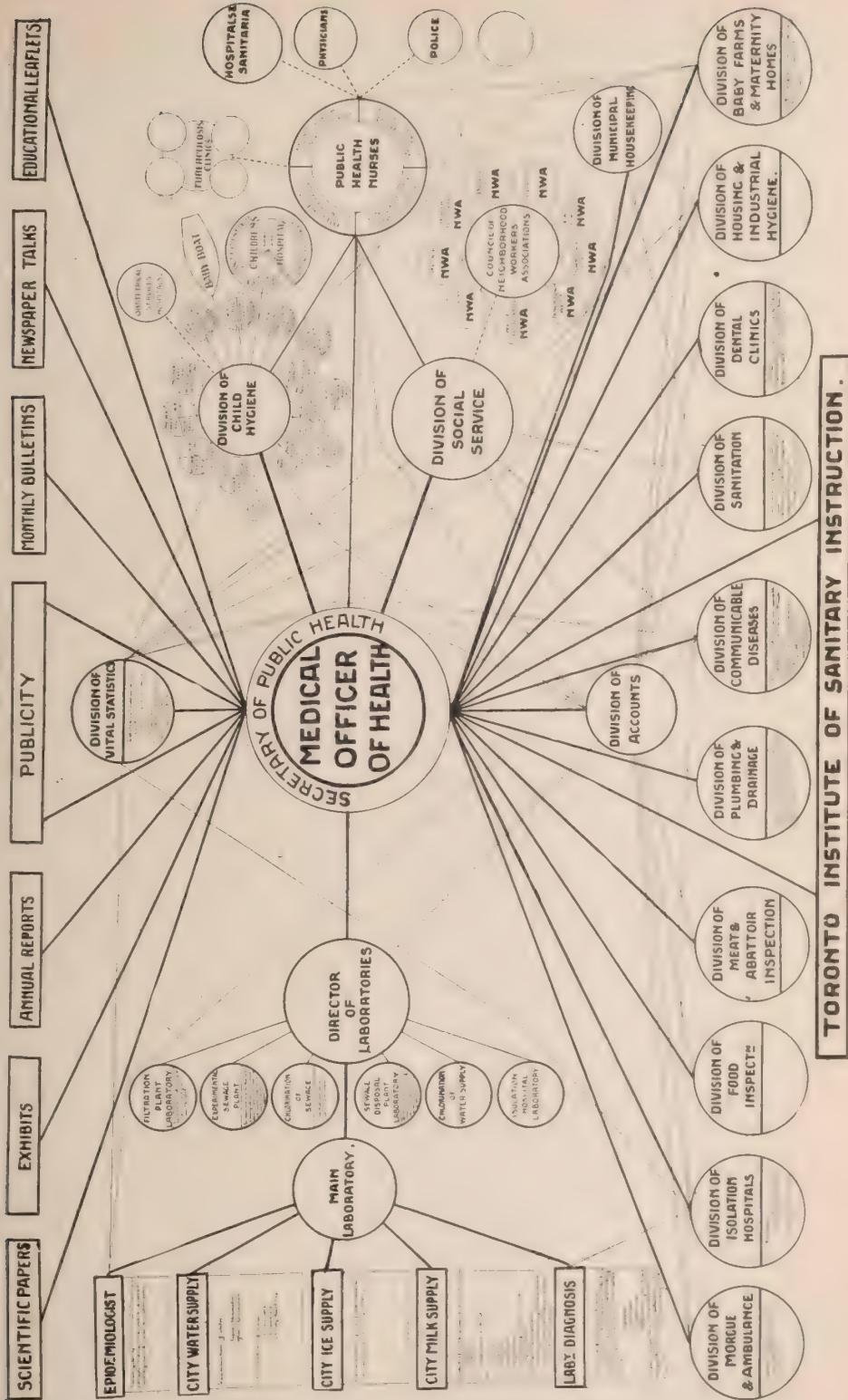
shown a yearly credit balance? Have we delivered the goods? Have we so democratized the knowledge that for years has been kept within the precincts of our colleges and laboratories, that it can be easily assimilated by the man on the street, or by the housewife in the humblest home?

In my judgment, the first duty of a department of health is to educate the public: enlighten the public through the press and by our health bulletins; by public addresses, and if it is necessary to resort to brass band methods, do so. Educate at any cost. Every citizen is entitled to know what we are doing and why we are doing it, and in return the enlightened public will demand a higher degree of efficiency. They will demand that if these diseases are preventable, that they be prevented, and with an enlightened public sentiment behind us, we can get anything.

When Cobden was fighting in the British House of Commons for the repeal of the Corn Laws, he once said: "I have come to the conclusion that if you want to get anything through the heads of the British people, you have to repeat it over and over again." I presume that statement will find pretty broad application. It is not limited to the British House of Commons. It has taken over half a century to instill into our surgeons the principles of antiseptic surgery and there are delinquents yet.

In addition to the foregoing methods of educating the public we must get closer to the people. If the mountain will not come to Mohammed, then Mohammed must go to the mountain. There are tens of thousands of

DIAGRAM OF ORGANIZATION



wives and mothers in all large cities, who for want of time or other reasons, don't read and consequently must be reached in some other way. This we think can best be accomplished through our Division of Public Health Nurses, our Division of Social Service and our Division of Municipal Housekeeping. Medical inspection of schools in Toronto is under the Board of Education. This, for obvious reasons, is a mistake. Departments of health are responsible for the health of all citizens from their prenatal state until they pass on to the next cycle of existence. They should, therefore, not have their hands tied at any intervening stage. Dividing of responsibility is not good administration, is not good economy and does not make for highest efficiency.

In the beginning of our present administration of public health in Toronto in 1910 we had one health nurse. We now have forty-four (44), and the city is divided into five (5) districts with a supervising nurse placed in charge of each district. We first had a tuberculosis nurse only; then tuberculosis nurse and child welfare, etc. Today our public health nurse embraces the tuberculosis nurse, the child welfare, child hygiene, the sanitary advisor and the social agent. In other words, she specializes in the home and not in disease, which means one visit to the home where two, three and four were formerly made. The nurses attend the clinics, the crèches, the milk depots, the Neighborhood Workers and all other medical and social organizations. They follow the cases to the homes, study the social conditions in the homes, ascertain if there

are others in the home requiring medical care; educate the mother on home sanitation, the care of the babies, the dangers of infection, the value of fresh air and sunshine. If a social problem is found, and there usually is, it is referred for its solution to the Neighborhood Workers or some other social agency.

In order that our nurses might be properly guided in the social aspect of our work, we employed over a year ago a trained social worker, a graduate of the New York School of Civics and Philanthropy. He is now Chief of the Division of Social Service. The nurses are also being trained in sanitation and domestic science, which information in turn filters through them to the mothers in the home. These divisions, together with the Division of Child Hygiene, have succeeded in correlating practically all the medical and social agencies in the city and, though they march apart yet they fight together, and are a most valuable asset of public health administration.

In the Division of Municipal Housekeeping the women visit the homes in the poorer districts of the city, instruct the mothers on all phases of sanitation in the home, better methods of living and domestic economy. They generally improve sanitary conditions around the home, and encourage the establishing of flower and vegetable gardens in the yards, which have for years been utilized as a storage for all sorts of refuse. Many of these yards have during the past two years been laid out in flower and vegetable beds and the neighbors seem to be vieing with each other as regard the choice

and variety of the flowers and plants. These women are sanitary instructors, not inspectors.

Toronto's mortality rate from the more acute communicable diseases, typhoid fever, diphtheria and scarlet fever, for the first ten months of 1910 was 110. For the first ten months of 1914 it was 28.3. The general death-rate for 1,000 population in the city for the first ten months in 1910 was 14.0; for 1914 it was 11.5. This decline has been gradual year by year. This, at the accepted value placed on a human life, gives us a fair credit balance. Then we have the saving of sorrow

and tears; the saving in high efficiency and many other items as a clean profit. These facts, together with an enlightened public, we feel is responsible for the appropriation of the Department of Public Health in Toronto in 1910 being \$85,388, and in 1914, \$277,958. The employees of the Department in 1910 numbered 76 and in 1915 they number 225.

It was the increased appropriation that made this possible, but, on the other hand, it was the enlightening of the public and the presenting to them of a yearly credit balance in life-saving, that secured the increased appropriation.



FULL-TIME HEALTH OFFICERS.

The necessity of health officers giving their full time to their official functions is pointed out by J. W. Kerr, Washington, D. C. (*Journal A. M. A.*, Nov. 6, 1915). In this country he says the health service has been a plant of slow growth, stimulated mainly by epidemics. The funds appropriated have been too adequate and the conditions all over the land have been bad. In Kansas, for instance, there were no full-time health officers prior to the present year and in Illinois, with the exception of the city of Chicago and La Salle, Peru and Oglesby, which have joined forces, there are, so far as reported, no full-time health officers at present, and only 106 paid health officers in the state, some of these receiving only \$5 a year. While local health administration should be the strongest defence against disease, it is in reality the weakest in our national resources. The federal or state governments cannot be expected to act

locally except in special emergencies and normally should only exercise advisory and supervisory control as regards local matters. Authority has been dissipated and intrusted to separate boards and commissions to the damage of public health in general. It would be advisable to have more joint action between communities, several jurisdictions combining to support health officers that can give all their time, and only this will give us efficient local health administration. In Germany, he says, he found by inquiry that the imperial government, while authorized to act, had found it unnecessary because of the efficiency of the local health authorities. Recent legislation in several states is reviewed by Kerr and some progress has been made toward having efficient local health boards, especially in certain states, such as North Carolina and Massachusetts and in proposed legislation in others. Such legislation should be encouraged.

CANCER AND THE PUBLIC HEALTH.

FRANCIS CARTER WOOD, M. D.,

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Read at the Symposium on Death-Rate of the Higher Age Groups, American Public Health Association, Rochester, N. Y., September 9, 1915.

This article by Doctor Wood is especially interesting to health workers and indeed to all readers of the Journal on account of the fact that it treats in a concise manner some of the fundamental points of importance known at the present time regarding this devastating disease. It is particularly suggestive as it indicates various ways in which state and local health authorities can direct their activities so that the people may be informed of the fact that early cancer is curable in most instances.

WITH investigations of the cause and attempts to discover a cure for cancer, those who are responsible for public health duties have but little concern. These phases of the cancer problem belong largely to the laboratory. Neither are they interested in the clinical study of human cancer after it has developed. That is a matter for hospitals and institutions endowed for such a purpose. For it is not likely that many states will feel called upon to establish and generously to maintain a laboratory and a hospital devoted to the abstract investigation of the cause of cancer in animals, and its detailed study in wards filled with human cases of this all too frequent disease, as has so admirably been done by the state of New York. Most states are still more interested in the diseases of cattle than in those of man, as the endowment of agricultural schools and stations shows. If such facilities should become generally available, an enormous field of investigation would be at once opened, one far more complex and

difficult than that of contagious disease, heretofore quite properly the main interest of the public health laboratories. I cannot enter at this time upon a detailed enumeration of such aspects of investigation. The records of any one of the large endowed cancer laboratories in this country or abroad will furnish ample food for thought to the interested. The main lines are, aside from the cause, hereditability, contagion, and finally, what most interests us all, the production of a protective immunity and an ultimate medical cure as distinct from the present mutilating surgical procedure.

Public health officials, however, have two very important and immediate opportunities in connection with this disease: (1) The supervision and study of the records of large numbers of cases from a statistical point of view; and, (2) The education of the public by bulletins, lectures, or demonstrations, preferably in collaboration with county or state medical societies, as has recently been done in Vermont.

What we know about cancer today

is relatively small in amount, and there are many problems for the elucidation of which further data are needed. The collection of such data must be begun at once in order that the material may be ready for final study ten or twenty years from today. That our statistics are now extremely defective is generally acknowledged. The Census Bureau has had to send some 35,000 letters to physicians asking that they make fuller and more accurate returns in cases of cancer, but, even should these records be completed as requested, the data so available would be far behind those of European countries. The statistics of hospitals, alone, are of but little value, because they cover only material selected geographically, and cannot be considered as accurately representing the normal population of the district in which the institution is situated. Such statistics give us only the proportions between the kinds of cancer which occur and cannot furnish anything of value concerning organ distribution; since, for example, a disproportionate number of patients with cancer of the stomach, or of the breast, or of other organs, may be attracted to a hospital because of the reputation of a particular surgeon as an expert operator in malignant growths of these regions. The real need is for accurate statistics by counties, as well as by states, in order that it may be determined whether there is any local variation in the different portions of a state, owing possibly to the influence of climatic conditions, soil, moisture, drainage, etc., on the occurrence of cancer. To secure valuable statistical

results, however, there must also be the collection of accurate census information as to the general population of the district, and the age and sex distribution; and in many states such information has not yet been obtained. When these data are once recorded, they can be used for larger purposes and are available for the publications of the Census Bureau.

The popular view that "cancer states," "cancer districts" or "cancer villages" exist has unfortunately been fostered by physicians unacquainted with statistical methods. Much has been done in England by the Imperial Cancer Research Fund and by the Registrar-General in their reports to explain the occurrence of large numbers of cases of cancer in certain districts by a study of the age distribution therein. Cancer being a disease of advanced life, it is usually found that such districts contain a large proportion of older people. In this country this is particularly marked in the New England States, Vermont and New Hampshire especially having high cancer death-rates; and the condition here can be ascribed chiefly to the drift of the younger population to the large cities outside of these states, and not to inbreeding or greater liability of the inhabitants themselves.

The study of the race distribution of cancer is also one of the important but as yet unsolved problems of this subject, and it rests upon the Southern States, with their large proportion of negroes, and upon the Western, with their still considerable Indian population, to assist in furnishing data for the elucidation of the questions of

frequency of occurrence in general, as compared to the white races, the proportional appearance in organs, and whether or not any absolute increase is going on in these limited race groups.

The interest of public health officials in occupational diseases is now widespread, and it is of the utmost importance that any correlation between a particular occupation and the occurrence of cancer be carefully investigated. It is well known that the workers in brass foundries are liable to cancer of the upper extremities, chimney sweeps and briquette workers to cancer of the scrotum, those employed in the manufacture of certain synthetic coal tar products to cancer of the bladder, and X-ray operators to cancer and leukemia; but there are many occupations as to which no information of this sort is as yet available, and this can be obtained only through the authority of state boards of health and with the concurrence and active interest of health officials. The importance of records of this sort in determining the rates for industrial insurance and workingmen's compensation is obvious, though apart from the cancer problem.

Writers differ greatly in their published statements concerning the correlation between trauma and malignant disease. The tendency in the past has been to assume that even a single injury may cause a cancer; but recently this view has been challenged from many sides and it is now generally believed that a single injury, unless it produces prolonged ulceration, as, for example, an X-ray burn, is of little

importance in the genesis of cancer; it is thought rather that only long continued irritations extending into adult life, that is, the period of susceptibility to cancer, are of any influence. The medico-legal interest in these facts needs no consideration here. With the data which will gradually accumulate from the Employers' Liability laws, it may not be impossible to cast some light upon this supposed relationship within the next twenty years, but the work must be started now in order that sufficient facts be available later.

With the increase in the laws regarding notification for venereal disease, and the general employment of the Wassermann test, it is beginning to be possible to study the relationship between cancer and syphilis. So far attention has been directed in this connection chiefly to cancer of the tongue, which seems often to have a syphilitic basis. In addition the relationship between cancer, syphilis, the excessive use of alcohol and of tobacco can be studied much better from broad general statistics than from the collection of small numbers of cases such as pass under the observation of the individual surgeon. Somewhat aside from this is the information now becoming available from the medical and statistical departments of the life insurance companies. While this material is highly specialized, and the facts, therefore, are not generally applicable to the population at large, yet certain special phases, such as the influence of alcohol on longevity have been studied, and the enlightened actuary of one large company is preparing a valuable analysis of the cancer situation.

While there is little reason at the present time to believe that heredity plays an important part in the occurrence of cancer, yet certain experiments in breeding mice have suggested that in these animals, at least, and in certain strains only, cancer may be subject to the laws of heredity. That these observations apply to man is doubtful, and the question can be settled only by very extensive studies which are of much more final value than breeding experiments. Such information as may be obtained of fair accuracy might be made a part of the death certificate.

While the fatal nature of cancer and its frequent occurrence are quite sufficient to keep alive a very potent interest in the cancer question, apart from any consideration of whether it is increasing or decreasing, such possible variation should be studied; first, because of its casting some light on the etiology of the disease; and, second, because of its practical importance as necessitating (if there be an increase) more frequent operative removal or medical treatment of such moles, senile keratoses or chronic ulcers as are apt to turn into cancer. Unfortunately it is impossible at the present time to make a definite statement as to any increase. So many conflicting factors are present that the statistical data do not as yet furnish a final decision. Equally able men hold that there is a demonstrable increase, and that there is none. In this situation the only remedy is the improvement of our mortality records, and however carefully these may be collected, they will never be of final value unless,

first, autopsies are performed upon all those dying of disease, whether supposed to be cancerous or not, and, second, microscopic examination is made of the suspected tissues. If this could be done, and the varieties of the tumor also determined, many of the questions now insoluble would be answered in a couple of decades. For, besides knowing whether cancer on the whole is increasing, we must also learn whether one variety or another is becoming more frequent, or whether the organ frequency is changing. Bashford's investigation of the London Hospital records showed that autopsies and microscopic examination increased the number of diagnosed cancer some 30 per cent.

These microscopic methods are too complex and too time-consuming for the practitioner to apply them, even if he had sufficient knowledge to make a diagnosis when the sections were prepared; which he has not. The state, therefore, should offer these facilities, and when they are offered, should require the submission of suitable specimens from all cases considered cancerous.

The discussion of the second phase of public health activities need not occupy very much of our time.

There is no question that the public, and even physicians whose medical degrees date back more than twenty years, are in many cases woefully ignorant of the fact that when a cancer can be diagnosed clinically with any ease it is already approaching an inoperable condition. There is still in the rural districts too much treatment of cancer with pastes and plasters, and

other palliative methods, and even in the large cities it is only too frequent. It is only within the past twenty years that the fact that in its early stages cancer is a local condition and may be removed with a likelihood of a permanent cure, has become generally known to the profession, and it is still unknown to a large majority of the lay public. Plain talks, illustrated by lantern slides showing the appearance of cancers in the early stages, with demonstrations of pathological material, are of the greatest educational value to the layman and to the physician, and such campaigns of education should be repeated at frequent intervals in order that the lesson may not be forgotten.

The immediate and satisfactory results of such an educational campaign have been shown in Vermont, where, following the talks, clinics, and demonstrations recently given, large numbers of patients have applied for treatment at the different hospitals. These have been sent in by physicians who had previously referred but few cases of the disease, or have come from localities which had not before furnished such material.

Since cancers which can be easily diagnosed clinically, are almost always inoperable, it is extremely important, as has been previously stated, that facilities be afforded to physicians to obtain microscopical diagnoses either without charge or at very small cost. Every state should regard as part of its public health interests the provision of one or more laboratories where specimens could be sent, and examined and reported on within a few days

by competent experts. This is already being done in many states in the case of diphtheria and typhoid fever, and the service should be promptly extended to malignant disease. Only in this way can there be prevented extensive and mutilating operations on persons who prove not to be suffering from cancer, and also only in this way can cancer be diagnosed in its early stages. Very wisely the state of New York has been among the first to offer these facilities under such excellent conditions as to staff and equipment as will guarantee prompt and accurate reports.

In this way the state can be of great aid in increasing our knowledge of cancer and in aiding the patient by supplying to the physician such opportunities for diagnosis as he cannot himself provide.

In conclusion, there is one other function which the state boards of health might well assume provided the necessary legislation could be obtained; that is, the regulation of the administration and sale of quack medicines especially those offered for the cure of cancer. There is no more pitiful spectacle nor one which more frequently confronts the physician than that of the patient suffering from an inoperable cancer, who has been reduced to absolute penury by the extortions of the unprincipled vendors of so-called cancer cures. Publicity has killed many of these cures merely by showing that they contain no substance which could be of the slightest therapeutic value; but this does not touch those which, being administered by their proprietors, are exempt from pur-

chase in the open market, and, hence, cannot be exposed by chemical analysis. If the state boards could obtain the right under the law to demand samples of these supposed remedies, the determination of their value would be a question of only a few months. Some animal tumors undergo spontaneous disappearance in a certain proportion of cases, being much less malignant than the corresponding variety in man, and these tumors form a most convenient indicator for the therapeutic capacity of any drug. If the quack remedy will not influence one of these growths, it certainly will

not cure a human tumor which practically never undergoes spontaneous absorption. The expense of such an experiment is practically nothing. Suitable strains of animals can always be obtained from any of the large research laboratories and the propagation of the tumors is most easy.

Such a censorship is the proper function of state boards and would be of inestimable value in protecting a public whose gullibility makes one sometimes doubt the famous statement of Abraham Lincoln concerning the impossibility of fooling all the people all the time.



PUBLIC HEALTH REPORT OF THE SECRETARY OF THE TREASURY.

The annual report of the Secretary of the Treasury as it relates to the Public Health Service contains numerous recommendations bearing on the functions of that organization and evidences the great interest of this department in the extension and expansion of the governmental agencies for the protection of the public health.

In the development of general public health work, according to the Secretary, there is great need of additional medical officers. The number of requests for advice and assistance in health problems received from states and municipalities during the past year has far exceeded that in any similar period in the history of the Service, but the limited number of officers available for the work has prevented in many instances compliance with these requests.

The field investigations, the Secretary states, have served as a stimulus to state and local health agencies, and every effort should therefore be made to encourage and turn to practical account the interest in health matters awakened in the general public. For this reason an in-

crease in the appropriation for field work is requested.

An additional building for the Hygienic Laboratory is urgently needed. The work of this institution has been greatly extended, particularly as it relates to the examination of viruses, serums and analogous products, a vast market for which has been recently created abroad. The safeguarding of these therapeutic agents requires great accuracy and precision and overcrowding is a serious handicap. In order that the public health may be better protected, an annual appropriation of \$25,000 is recommended to be expended in carrying out the provisions of the law relating to the examination of these products.

The United States is the only government of importance which does not provide for the care and isolation of lepers. The establishment of a national leprosarium where the numerous lepers, most of whom are native born Americans, may be properly segregated and treated, thereby eliminating a menace to the health of others, is urged.

THE BACTERIAL EXAMINATION OF SAUSAGES AND ITS SANITARY SIGNIFICANCE.

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DURING the last decade considerable attention has been directed to the question of pure food and its sanitary distribution not only by reason of government inspection, but also because of an increasing public demand for pure food. For many years German officials have recognized the possible danger to public health from improperly prepared or handled sausages. French and English sanitarians have also recognized the importance of this question and have conducted some experimental work to ascertain the extent of the danger; but in the United States there seems to have been little or no work reported on sausages.

The nature of sausages and the finely ground meats composing them have led to much speculation on the part of consumers as to the quality and kinds of meat that might be used. Sausages are popularly reputed to contain anything from good pork and beef down to horse, dog and cat meat, as well as bread, flour, and other starchy substances. The presence of partially decayed meat may be effectively covered up by high seasoning, salting and smoking as well as by preservatives. Probably the most common adulterant added to sausages is starch either in the form of old bread or corn starch. Ostertag* reports that in Germany it is customary to add 2

per cent. of starch to all "brühwurst" and even as high as 5-8 per cent. The manufacturers prefer not to consider this as an adulterant, but claim that it is added to bring the "combining power" of the sausage to a proper point so that less shrinkage will occur in cooking and more food value be retained. The custom of rapidly fattening hogs is said by Ostertag to produce a fat that cooks away more than does that in hogs more slowly fattened, and the small amount of starch added only restores the swelling capacity of the muscle albumin and is hence not considered an adulterant.

The use of uncooked and visceral sausages, which are especially likely to contain pathogenic bacteria, has made the sausage problem in Germany of more importance than it is elsewhere. Lungs, spleen, liver and brains are often used in German sausages in large amounts. It is well known that pathogenic organisms are particularly likely to occur in the spleen and liver, while the keeping quality of the sausages are at the same time reduced by their use.

Savage† classes the danger from sausage poisoning under three heads:

1. From toxins produced by the ordinary bacteria of decomposition. This poisoning is generally not severe.
2. From infection with members of

* Ostertag, Robert. *Handbook of Meat Inspection*, 1904.

† Savage, W. G. *Med. Press and Circ.*, London, 1908, n.s. 86, p. 167.

the enteritidis group. This he considers a real source of danger to public health that is not completely obviated by either cooking or salting. In an experiment with sausages containing *B. enteritidis*, even a fairly well cooked sample contained the living bacteria in its interior. A 10 per cent. salt solution was found to kill the pathogens very slowly and six days were required to render the sausage sterile by this means.

3. Poisoning due to the toxins of *B. botulinus*. Outside of Germany, where it is present in visceral sausages, *B. botulinus* is rarely found, and even there it is much less common than formerly.

The number of bacteria in ordinary sausage varies greatly and very little significance can be attached to mere numbers. In well cooked, smoked sausages v. d. Slooten¹ found the number of bacteria very low and in one plating the sausage was sterile. He found that the diminution in the number of bacteria was greatly influenced by the drying and smoking process. One raw sausage sample became sterile after a week's smoking. In highly seasoned sausages many kinds of bacteria are unable to survive. The cocci are more resistant to salt and are consequently found in relatively larger numbers in highly seasoned meats. Even if very large numbers of bacteria are present, the greater part may not be unwholesome. No definite standard of bacterial content has been accepted which must

not be exceeded if a sausage is to be considered wholesome. Savage believes that little importance can be attached to the number of bacteria present but considers the presence of intestinal bacteria of great significance. v. d. Slooten, nevertheless, sets the limit at 2,000,000 per gram and considers all containing over that number unfit for use unless an examination shows them to be harmless. Weinzirl and Newton² from their work on hamburger steak have suggested that 10,000,000 bacteria per gram be taken as a standard for a sanitary meat. They found, however, that this standard did not correspond in all cases with the "organoleptic" test.

The presence of *B. paratyphosus* and *B. enteritidis* in sausages has been reported from time to time by various observers. Rommeler³ has recorded the work of Hübener who examined 100 samples of sausages and found *B. paratyphosus* six times. Mühlens, Dahm, and Fürst⁴ fed 57 samples of all kinds of meat to 138 white mice and concluded that 24 of the samples contained *B. paratyphosus* and 13 contained *B. enteritidis*. Discredit has been thrown on the value of this work by more recent investigation showing that auto-infection may occur in mice with members of the enteritidis group especially where the normal nutrition of the animal is disturbed. In his own researches on visceral sausages Rommeler found *B. paratyphosus* in 8 out of 50 samples. Komma⁵ examined 102 samples of sau-

¹ v. d. Slooten. *Inaug. Diss.*, Bern., 1907. (Cited by E. Roth in *Cent. f. Bakt.*, 1 Abt. Ref. 43, p. 403.)

² Weinzirl and Newton. *AM. JOUR. PUB. HEALTH*, 1914, 4, p. 413.

³ Rommeler. *Cent. f. Bakt.*, 1 Abt. Orig., 1909, 50, p. 501.

⁴ Mühlens, Dahm and Fürst. *Cent. f. Bakt.*, 1 Abt. Orig., 1908-09, 48, p. 1.

⁵ Komma, Franz. *Cent. f. Bakt.*, 1 Abt. Orig., 1910, 55, p. 1-14.

sage and found 30 of them to contain *B. paratyphosus*. He believes that their presence is due to uncleanness in manufacture as these organisms are found normally in the intestinal tract of the animals employed. Hübener¹ believes that meat poisoning from *B. paratyphosus* from healthy animals is questionable. In 65 cases of meat poisoning with positive bacterial findings he reports 36 due to *B. paratyphosus* and 29 to *B. enteritidis*. The toxin given off was so great that in some cases 2 cc. of bouillon in which they were grown, when injected into a mouse, caused death. Heinemann² reports an instance where two people were poisoned with *B. paratyphosus* from cooked sausage and one from raw meat obtained from the same butcher. Schmidt³ found in healthy animals (hogs and horses) *B. paratyphosus* present that were not pathogenic. It should be mentioned, however, that the large number of cases in which members of the enteritidis group have been found by German investigators and called *B. paratyphosus* or *B. enteritidis* may be due to classification based on morphology and cultural characteristics alone. It is a well-known fact that many organisms thus classified cannot finally be identified as such by the agglutination test.

B. coli has been found almost constantly in sausages but little importance has been attached to its prevalence by most observers. Savage examined 12 samples of home ground sausages and found *B. coli* present in every case in numbers varying from

10-45,000 per gram. In 92 per cent. there were more than 100 per gram. He believes that they multiply rapidly in the sausages. In order to determine whether these bacteria were introduced in the skin used for a casing for the sausage, Savage examined twelve samples of casings, commercially prepared with salt brine, and found all to be free from *B. coli*. If *B. coli* survives this pickling process, he believes that the danger from pathogens surviving may be real. Maurel⁴ has constantly observed the presence of a diplococcus in the sediment from apparently good sausages which produced a marked loss of weight in injected rabbits. By lowering the resistance through the introduction of small amounts of mercuric chloride, the loss after the injection of the diplococcus became much more marked. The organism could be found abundantly in the blood of the rabbits after forty-eight hours. The loss of resistance brought about by the mercuric chloride is ascribed by Maurel to a partial destruction of the phagocytic power of the leucocytes. He draws the inference that this diplococcus might be harmless to healthy individuals but under conditions of lowered resistance, from whatever cause, might become pathogenic.

The viability of organisms in sausages has been studied by different observers. Maurel⁵ sterilized the surface of sausages, in bulk and slices of bologna, in an autoclav, tested for sterility and then infected them with colon and typhoid bacilli. Both organisms seemed to increase and main-

¹ Hübener, E. Jena (Gustav Fisher), 1910.

² Heinemann. *Zeitschr. f. Med. Beamte*, 1911, Beil. No. 1, p. 1.

³ Schmidt, P. *Münch. med. Wochenschr.*, 1911, p. 563.

⁴ Maurel, E. *C. r. Soc. de Biol.*, 1911, 70, p. 617.

⁵ Maurel, E. *C. r. Soc. de Biol.*, 1910-69, pp. 513, 574.

tain their activity for at least 24 hours and often for many days when placed in Petri dishes and kept at 35°C. B. typhosus, he found, died off slightly sooner than B. coli.

Very few detailed accounts of the methods used for the bacterial examination of sausages are to be found in the literature. Rommeler and Komma used essentially the same methods. The instruments and surface of the sausage were sterilized in hot oil, the sausage carefully opened and a cube-shaped portion taken from the inner part of the sausage and placed in a deep Petri dish. Sterile salt solution was poured over in which the meat was thoroughly emulsified. A knife point of papain, previously sterilized in a dry oven in a Petri dish at 130°C., was added and the emulsion incubated for two days at 37°C. By this time the sausage was digested and a drop of the liquid of a proper dilution was spread over a brilliant-green-picric-acid plate and also over a Conradi-Drigalski plate. The developing colonies that resembled the intestinal bacteria were then transferred and identified in the various media and by the agglutination test. Savage sterilized the outside of the sausage by cauterization, opened it sterily and took about two grams, weighed accurately, into a bottle with a rubber stopper containing 20 cc. of sterile water. After thorough mixing, various quantities of the emulsion were added to lactose-bile-salt media and the resulting colonies transferred and identified in the various media. Weinziel and Newton ground samples of meat (hamburger steak) with sterile sand in

a mortar and obtained an emulsion in salt solution from which the necessary dilution were made. One cc. of the dilutions was plated on 1.5 per cent. agar with a reaction of 1.5 per cent. acid and incubated at 20°C. They made no effort to isolate intestinal bacteria. v. d. Slooten believes that animal experimentation is of great value in determining the wholesomeness of sausages. He used a water extract of the sausage and injected subcutaneously into mice, guinea pigs and rabbits. With good sausage no effect should be noticed on the animal.

The purpose of the work described in this paper is:

1. To determine the number of bacteria present per gram of meat and to find the factors influencing it.
2. To determine the prevalence of fecal or pathogenic organisms in the sausage.
3. To determine the presence of adulterants.
4. To determine the prevalence of the use of preservatives.
5. To find the influence of sanitary marketing on the bacterial content.
6. To determine the effect of cooking on the bacterial flora.

General Technique.—The thirty-four samples of pork sausage examined have been obtained under the usual conditions found in the meat markets of Chicago and have been brought directly to the laboratory for examination. Each shop has been scored on the basis of 100 per cent. on the sanitary surroundings, method of handling, exposure of meat, light and ventilation, cleanliness of workers and refrigeration at the time the sample

was taken. At the laboratory the utensils and the outside of the sausage were sterilized, the sausage being rotated in the gas flame for about fifteen seconds. The sausage was then carefully cut open with a sterile knife and three or four grams of the meat taken from the interior and accurately weighed. This was then emulsified thoroughly in an Erlenmeyer flask by means of a sterile glass rod with 100 cc. of sterile water. From this emulsion dilutions were made to 1-1,000,000. For the total count twenty-four hours' incubation at 37°C. and forty-eight hours' incubation at 20°C. on 1 per cent. glycerin agar neutral to phenolphthalein was used. For distinguishing roughly the intestinal bacteria, Endo medium +.5 was employed. Besides plating on these media, 1 cc. of each dilution has been added to a 1 per cent. dextrose broth fermentation tube to determine the number of gas-forming organisms. One cc. of the first two dilutions was added to each of three tubes of Torrey's medium* +.2 to +.5, containing respectively .15, .2, and .25 cc. of a 1 per cent. brilliant green solution in water. Forty-eight hours after plating, the colonies that on Endo looked like *B. coli*, *B. paratyphosus*, *B. typhosus*, *B. fecalis*, *Proteus* or *Streptococcus* were transferred to Russell's medium, and, in case of characteristic growth, each variety was studied morphologically in hanging drops and stains and transferred to litmus milk, gelatin, and 1 per cent. dextrose, lactose, and saccharose broths for further observation and final identification. Agglutina-

tion tests with paratyphoid and enteritidis serum were employed on seven of the nine organisms which apparently belonged to the enteritidis group. After twenty-four hours' incubation at 37°C., Endo medium plates were made from each of the brilliant green tubes and any developing colonies treated as from the original plating on Endo. At the end of forty-eight hours the fermentation tubes were examined and any sediment leading to suspicion was examined in stained preparations for streptococcus. In instances where *B. coli* failed to develop on Endo from the original plating, any dextrose tubes containing gas were plated and an effort made to isolate *B. coli*. By these methods *B. coli* was isolated from thirty of the thirty-four samples examined. Samples 13, 25, 29 and 31 showed no *B. coli* by any of these means. Sixty-six per cent. of the samples contained over 100 *B. coli* per gram of meat. In one instance, Sample 7, which was home-ground and not put up in link form, there were 38,000 *B. coli* present per gram. The total bacterial count both at 37°C. and 20°C. varied widely, the former from 2,500 per gram in Sample 33 to 1,538,000 per gram in Sample 9, the average being 158,000; the latter from 650 per gram in Sample 10, which was taken directly from the farm as soon as made, to 200,000,000 per gram in Sample 1, the average for all samples being 9,018,000. Little value can be attached to these averages in so wide a variation and with so few samples examined. In Table 1 a tabulation of the count from each sample is re-

*Torrey J. C. *Jour. Inf. Dis.* 1913, 13, pp. 263-272.

TABLE 1.

Sample number.	Score of shop.	Method of marketing.	Bacteria per gram meat at 37°C. 24 hours.	Bacteria per gram meat at 20°C. 48 hours.	B. coli present per gram.	Gas formers with dextrose per gram.	Corn starch per cent.	Sulfites.	Kinds of bacteria isolated.
1	86	Small link, bulk	910,000	200,000,000	+	+	2	Not tested	B. coli
2	89	Small link, carton	807,000	8,000,000	+	+	0	"	B. coli
3	84	Home-made, bulk	4,600	2,300,000	300	250	0	"	B. coli, B. fecalis
4	79	Home-made, bulk	4,300	72,000	1,600	4,000	3	"	B. coli, M. tetragenus
5	87	Small link, carton	8,800	144,300	850	3,500	0	"	B. coli, B. fecalis, Prot. vulgaris
6	86	Small link, carton	369,000	2,181,000	15,000	37,000	2	"	B. coli, Streptothrix, B. intestinalis
7	81	Home-made, bulk	131,600	6,269,000	38,000	31,000	3	"	B. coli, B. paracoli
8	88	Small link, bulk	58,800	16,755,000	3,600	4,000	6	"	B. coli, Prot. vulgaris, B. fecalis
9	86	Small link, carton	1,538,400	282,800	950	4,000	0	"	B. coli, B. fecalis, yeast
10	Farm	Direct from farm, bulk	47,000	650	200	350	0	"	B. coli
11	89	Home-made, bulk	27,000	6,758,000	7,400	31,000	0	"	B. coli
12	82	Small link, carton	271,500	271,500	1,500	300	0	"	B. coli, Prot. vulgaris
13	82	Small link, carton	35,900	1,900,000	0	0	0	"	B. coli anserogenes, B. fecalis
14	81	Small link, bulk	3,700	1,962,000	31	310	6	"	B. coli, Streptococcus
15	82	Small link, bulk	119,000	562,000	2,500	41,320	0	"	B. coli, B. paracoli, Prot. vulgaris
16	87	Small link, bulk	19,700	7,561,000	900	4,000	5	"	B. coli, Streptococcus, yeast
17	85	Small link, bulk	6,300	2,200,000	350	5,000	3	"	B. coli, B. paracoli, † yeast
18	89	Small link, home-made	2,600	641,400	34	340	0	"	B. coli, Prot. vulgaris, B. fecalis

TABLE 1—(Continued).

Sample number.	Score of shop.	Method of marketing.	Bacteria per gram meat at 37°C. 24 hours.	Bacteria per gram meat at 20°C. 24 hours.	B. coli present per gram.	Gas formers with dextrose per gram.	Corn starch per cent.	Sulfites.	Kinds of bacteria isolated.
19	83	Small link, bulk	646,700	36,800	382	2,500	0	Not tested	B. coli, Prot. vulgaris fluorescens, yeast
20	83	Home-made, carton	16,100	2,200	28	280	0	"	B. coli, Prot. vulgaris
21	86	Small link, bulk	30,000	20,482,000	180	30,000	5	"	B. coli, B. paracoli, † B. fecalis, yeast
22	74	Large link, bulk	12,500	5,600	1,000	24,000	5	+	B. coli, Prot. vulgaris
23	71	Small link, bulk	20,000	56,700	700	3,500	12	+	B. coli, Prot. vulgaris
24	59	Large link, bulk	39,600	773,600	57	286,000	0	0	B. coli, Staph. aureus, B. paracoli, †
25	77	Large link, bulk	4,000	36,900	0	3,000	8	+	B. coli
26	60	Small link, bulk	10,400	4,467,500	155	2,600	4	0	B. coli, Prot. vulgaris
27	55	Large link, bulk	33,000	1,568,000	10,000	20,000	8	+	B. coli
28	71	Home-made, bulk	24,400	3,397,000	24	240	0	+	B. coli, Prot. vulgaris B. paracoli† Staph. aureus
29	64	Large link, bulk	5,340	3,353,000	0	340	5	0	Prot. vulgaris, B. paracoli†
30	74	Large link, bulk	75,000	2,211,000	182	2,000	4	+	B. coli, Streptococcus, yeast
31	80	Small link, bulk	10,800	100,000	0	2,600	10	+	Streptococcus, B. fecalis, yeast
32	89	Small link, carton	33,100	2,108,000	117	23,400	?	0	B. coli
33	75	Small link, bulk	2,500	7,873,000	83	8,300	6	+	B. coli, Streptococcus, B. paracoli†
34	75	Large link, bulk	3,700	1,823,000	92	1,840	4	0	B. coli, Staph. albus, B. paracoli†

Samples 1-21 from markets in good residence district; 22-34 from poorer markets.

* Exact record not taken.

† Agglutination negative with paratyphoid and enteritidis serum.

recorded. Samples 1-21 were all taken from shops in a good residence district of Chicago, near the University of Chicago, that are above the average from a sanitary viewpoint, while Samples 22-34 were taken from poorer, less sanitary districts on the west side of the city. These shops were in most cases highly unsanitary, yet the counts on samples from these unsanitary shops showed no increase over those on samples from shops scoring higher. In fact the average count of the samples from the more sanitary shops at 37°C. was 241,000 per gram against 24,000 per gram from the west side shops. The 20°C. count showed an average of 13,280,000 against 2,133,000 from the respective regions. This may indicate that the sulfite found in many of the west side samples was an important factor, either in the prevention of the bacterial multiplication or in the destruction of the bacteria originally present, resulting in the lower count. In the west side samples free from sulfites, however, there seemed to be no constantly greater number of bacteria present than there were in the samples containing sulfites.

Influence of Casings.—An effort was made to determine the influence of the sausage casings on the bacterial count. For this purpose the scrapings from the interior of the casings from seven samples, 13-19, were run parallel with the interior contents of the same sausage. The sausages were split open with a sterile knife, the contents taken out and the inside of the skin scraped. The seven samples run in this manner showed the following results:

1. In five of the seven samples the

37° count of the scrapings at twenty-four hours was greater than that of the interior content.

2. In four of the seven samples the 20° count of the scrapings was greater.

3. In five of the seven samples the 37° count of *B. coli* was greater in the scrapings.

4. In one sample no *B. coli* was found in the scrapings while there were a few in the interior of the sausage.

5. In one sample an intestinal organism related to the enteritidis group was found in the scrapings but not in the interior of the sausage while in one sample it was present in both.

6. *Proteus vulgaris* was present in three of the seven samples of scrapings.

Samples 9, 10, 11, and 12 were treated according to the methods of Rommeler and Komma for the isolation of *B. paratyphosus*, in addition to the routine method. It was found that after digestion for forty-eight hours one drop of the solution produced such an overgrowth that dilution was necessary to distinguish individual colonies. As there seemed to be no advantage by this method over that of Endo while it was more difficult to employ, it was discontinued.

Brilliant Green.—Brilliant green has been used in routine according to the methods described by Torrey for the isolation of members of the enteritidis group. The reaction of the media has been varied from +.2 to +.5 and the amount of the brilliant green from .15 to .25 cc. of 1 per cent. aqueous solution added to 10 cc. of broth. In two of the nine cases where enteritidis group

organisms have been isolated, they have been isolated by this means. The reaction and amounts of green added within the limits employed produced little difference. Seven times enteritidis group organisms were obtained from Endo but failed to develop in the brilliant green while *B. fecalis*, *B. coli* and *Proteus* survived at the end of twenty-four hours in four, three and two cases respectively. In Sample five all other varieties of organisms were killed but a member of the streptothrix group. In about 60 per cent. of the samples the brilliant green tubes were sterile at the end of twenty-four hours.

The following organisms have been isolated by the methods described above from the thirty-four samples: *B. coli*, thirty times; *Proteus vulgaris*, eleven times; *B. paracoli* (organism resembling *B. paratyphosus* morphologically and culturally but not agglutinated by either paratyphoid or enteritidis serum), nine times; *B. fecalis*, eight times; yeast, eight times; streptococcus, five times; *Staph. aureus*, two times; and *M. tetragenous*, a streptothrix, *B. intestinalis*, *B. coli anærogenes*, *Proteus fluorescens* and *Staph. albus*, once each. The presence of intestinal organisms in so many cases is possibly indicative of unsanitary and careless methods of manufacture but a more extended study would be necessary to determine the significance of these forms. *Proteus vulgaris*, which was present in one third of the samples, might indicate that old meats in which decomposition had begun were used but in the absence of control tests on known fresh meats

for the presence of this organism, should not be given too much importance.

Sulfites.—Samples 22–34 were tested for the presence of sulfites. Five to ten grams of the meat to be tested were placed in an Erlenmeyer flask of 150 cc. capacity, two or three grams of finely granulated C. P. zinc added and then about 30 cc. of strong C. P. HCl poured over the mixture. Controls were always run parallel with the samples and a distinct silvery-black mirror on a filter paper soaked in lead acetate and held over the mouth of the flask five minutes, was considered a positive reaction for the presence of sulfites. A faint gray-black discolorization will generally be obtained from sausages free from sulfites at the end of five minutes but there is never seen the intense black mirror shown by samples to which the preservative has been added. By this means seven of the thirteen samples were shown to contain sulfites, five contained none and one was doubtful. Although sulfite tests were not carried out on Samples 1–21, fifteen samples obtained from the same shops subsequently were examined. Of these samples, three only contained sulfites. Samples 29 and 34, manufactured by the same packing house but obtained from different shops, contained no sulfites, while Samples 30 and 33 manufactured by a different firm, both contained a large amount of sulfites. The samples containing this preservative appeared to have no fewer bacteria per gram than those without the preservative, although the meat might have been originally of poorer quality and the

bacterial count held low by the presence of sulfites.

Starch Adulteration.—Each of the thirty-four samples was examined microscopically for starch adulteration. In samples containing more than 5 per cent., the starch could readily be detected by the eye and taste and gave the sausage a granular appearance. The sausage was rubbed over a microscopic slide and examined fresh to determine if possible the kind of starch granules present. Then Lugol's solution was added and allowed to remain on the slide for a minute and the preparation examined for the presence of the blue-stained starch granules. From the macroscopic and microscopic examination a rough estimate was made of the per cent. of starch added. It must be borne in mind that the pepper used for seasoning contains normally 35–45 per cent. of starch and dextrin and may give a somewhat similar appearance to other starch in stained preparation. It may also happen that the pepper itself may be adulterated with buckwheat middlings or other starchy substances. Cornstarch was very commonly used in a very finely ground condition. It was present in 19 of the 34 samples or in 56 per cent. of all. In 26 per cent. of the samples, 5 per cent. or over was used. It was interesting to note that starch was present in 77 per cent. of the thirteen samples from the poorer districts and in only 38 per cent. of the samples from the more sanitary shops, and that the price per pound in these districts was 13–15 cents and 18–25 cents respectively. In other words the customers of the west side shops are buy-

ing starch while the customers of the shops in the better residence districts are buying meat. In the samples that contained starch from the latter district, the per cent. was generally much lower than in samples of the west side as may be seen by reference to Table 1.

Influence of Cooking.—Six samples of pork sausage have been obtained and cooked in various ways in the laboratory to determine the effect of cooking on the bacterial count. It has been the purpose to cook the sausages as nearly as possible as they are cooked in the home. The methods and thoroughness of cooking varies greatly in different homes. This fact has made it desirable to vary the time and method of cooking. A sample of the uncooked sausage was always run in parallel in order to determine the efficiency of the cooking. The sample from the cooked sausage was always taken from the interior after splitting the sausage open under aseptic conditions. Small pork sausages in link form were employed in all cases. It was found in general that cooking destroyed a very large per cent. of the bacteria; and that extra well-cooked sausage in two of the samples were sterile. The detailed results with the conditions of cooking are shown in Table 2. The efficiency of cooking will be seen to vary only within the narrow limits of 93.3 per cent. in Sample 3 to 100 per cent. in Sample 2.

Four samples of sausage cooked in restaurants were obtained and brought directly to the laboratory to be examined as a control on the efficiency of ordinary restaurant cooking. The methods of examination were the same

TABLE 2.

Sample No.	How prepared.	Bacteria per gram 24 hours at 37°C.	Bacteria per gram 48 hours at 20°C.
1	(a) Uncooked	10,500	813,000
	(b) Let simmer in water 10 min. Fried in lard (cold at start) 15 minutes	500	0
	(c) Let simmer in water 10 min. Fried in lard (cold at start) 20 minutes	300	0
2	(a) Uncooked	47,500	929,000
	(b) Let simmer in water 10 min. Fried in lard (cold at start) 10 minutes	0	0
	(c) Let simmer in water 10 min. Fried in lard (cold at start) 15 minutes	0	0
3	(a) Uncooked	33,000	5,700,000
	(b) Boiled in water 20 minutes	31	190
	(c) Boiled in water 30 minutes	0	105
4	(a) Uncooked	55,000,000	80,000,000
	(b) Boiled in water 15 minutes	3,300	200
	(c) Boiled in water 20 minutes	130	0
5	(a) Uncooked	110,000	47,700,000
	(b) Fried in hot lard over asbestos 10 minutes	7,300	100
	(c) Fried in hot lard over asbestos 15 minutes	60	60
6	(a) Uncooked	950,000	132,000,000
	(b) Fried in hot lard over wire gauze 8 minutes	70	200
	(c) Fried in hot lard over wire gauze 12 minutes	0	0

as described above. A small amount of the interior contents being carefully taken and emulsified in sterile water for plating. The results as will be seen vary widely, from an absolutely sterile sample, 3, to one containing 8,000

bacteria per gram. The detailed results are seen in Table 3.

The necessity for the proper sanitary handling of sausage in its manufacture and distribution is self-evident. It is probable that intestinal bacteria

TABLE 3.

Sample No.	Bacteria per gram on 1.5 per cent. glycerin agar (neutral).	
	37°C. for 24 hours.	20°C. for 48 hours.
1	55	205
2	61	0
3	0	0
4	1,075	8,000

enter during the manufacture and that the method of subsequent handling is responsible for the large number of bacteria that develop at 20° C. This fact is illustrated by one sample, No. 10, which was brought directly from the farm where it was ground under ordinary farm conditions. The 20° count was unusually low, 650 per gram.

From the work described in this paper the following conclusions may be drawn:

1. The number of bacteria per gram of sausage varies so widely that little importance can be attached to the bacterial count alone. Many factors, such as the precautions used in manufacture, proper handling in the shops, and the presence of preservatives may influence the count greatly.

2. Skins used as casings, if properly prepared, cannot be considered to increase the bacterial count or the danger from pathogens.

3. Brilliant green as an aid in the isolation of the enteritidis group has proved of limited value only.

4. *B. coli* is commonly present in sausages. Organisms biologically related to but not identical with the enteritidis group were present in 25 per cent. of the samples and *Proteus vulgaris* in 33 per cent. of them.

5. Sulfites were present in 54 per cent. of the west side samples and in 20 per cent. of the samples later obtained from the more sanitary shops.

6. Corn starch was found in many samples in amounts varying from 2-12 per cent. Fifty-six per cent. of all samples contained some starch.

7. Ordinary cooking is effective in destroying a large per cent. of the bacteria present.

I desire to express my appreciation to Professor Edwin O. Jordan for valuable suggestions in this work.



PROPOSED MEDICAL CONSOLIDATION IN NEW YORK.

A plan to merge the health department, the Department of Charities, and Bellevue and Allied Hospitals into a single Department of Social Service under one head recommends itself, according to the *Evening World* for November 5, as a businesslike, common sense step toward setting the municipal corporation on a new basis of economy and efficiency.

These three departments handle over \$9,000,000 a year. Their work is so closely allied, particularly in the case of the health and charities departments, that one bureau is constantly duplicating the inquiries and remedial measures of another. If they were consolidated their agents and investigators could work together on the same cases, administering relief with the least possible waste of time and money. Moreover, a single head could purchase at a considerable saving the millions of dollars' worth of

supplies which these departments now buy separately.

To taxpayers the proposal is welcome, not only for the specific saving it contemplates but also because it should lead to a general scrutiny of city departments with an eye to consolidation, concentration, and increased efficiency. The suggestion has been made that combining the Department of Bridges with the Department of Docks would save the city half a million each year; also that municipal expenses could be reduced at least \$250,000 by abolishing the commissioner of accounts, much of whose work could be as well or better done in the comptroller's office.

It is thus that the executive heads of any private corporation set to work to get results. The city hopes it at last sees the beginning of just such a program.—*New York Medical Journal*.

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THE DISPENSARY AND THE DISEASES OF SYPHILIS AND GONORRHOEA.

Dr. Richard Cabot once illustrated the situation of the tuberculosis patient after being told of his disease and the required treatment of sunshine, fresh air, rest, etc., by reference to the incident in "Alice in Wonderland" in which the King, after inviting Alice to have some cake, replies to her remark that she doesn't see any, that there isn't any. Great strides in supplying the cake for the tuberculous individual have since been made, but the victim of syphilis or gonorrhoea stands today where the former stood ten years ago. An increasing number of health departments are providing laboratory assistance in the diagnosis of venereal diseases, available to private physicians and both public and private institution directors. Following this, certain of the best organized and progressive municipal or state departments have established advisory consultation hours for venereal diseases, either separately or as a part of the general service for infectious diseases. But having diagnosed the case and advised concerning the disease, the questions, "Where shall I go for treatment?" "How can I carry out these instructions?" are usually met by an admission that nothing further can be done. At this point, the dispensary is coming to the rescue through the reorganization of free clinics, the establishment of evening pay clinics, and the extension of social service to the venereal diseases. A sufficient number of institutions have thus organized such services under genito-urinary and gynecological or other divisions to prove their practicability and usefulness. Already this second step has led to the demand for a third, *i. e.*, the provision by hospitals of adequate facilities for observation and treatment of cases with which the dispensary cannot effectively deal alone.

That there is need for a survey of all these facilities for the diagnosis and treatment of venereal diseases in each of our cities is indicated by the accumulat-

ing evidence being gathered in New York City.* One study of twenty-seven clinics offering treatment for syphilis shows that only seven meet the requirements of the Associated Out-Patient Clinics and only four of twenty-six clinics offering treatment for other venereal diseases meet these standards. The records of only two of these clinics could be profitably analyzed, the results of the analysis showing less than 10 per cent. of the patients dismissed as cured. A study of thirty general hospitals shows that only ten receive recognized cases of syphilis in actively infectious stages, but that care and treatment will be given in twenty-seven if the patient has been admitted upon the basis of some other diagnosis, and nine will receive adult cases of gonorrhœal infection clearly requiring hospital treatment. Thirteen will not receive known complications of syphilis or gonorrhœa. No standard of administration similar to the requirements of the Associated Out-Patient Clinics exists for hospitals. Only seventeen of the thirty cited make any attempt at providing the services of a syphilologist. The regulations of five of these hospitals require three tests before discharging a syphilitic—(a) healed lesions, (b) entire disappearance of symptoms, (c) at least one negative Wassermann. One hospital requires two tests before discharge of a gonorrhœic patient—(a) negative complement fixation, (b) negative prostatic massage (for men) or negative cervical smear (for women). The remaining hospitals either have no regulations or refer discharged cases to the social service department for inadequate follow-up work.

The list of health departments, dispensaries, hospitals, and other agencies beginning excellent work in attacking the administrative problem of venereal disease control is already too long for enumeration, but when it is realized that careful investigations covering a constantly increasing number of individuals, representing every class of citizen and all types of occupations, show evidence of syphilis in from 8 per cent. to 25 per cent. of those examined, and in certain groups (exclusive of prostitutes) 40 per cent., relatively higher percentages being found for gonorrhœa, the need for rapidly extending the work begun by the pioneers is obvious. Health officers particularly should make every effort to stimulate interest in this difficult problem of preventive medicine which seems at last to have reached the stage for administrative action.

WHY A SOCIOLOGICAL SECTION?

A number of American Public Health Association members at recent annual meetings have expressed a doubt as to the exact purpose and function of the Sociological Section. This attitude has been more or less shared by the officers and members of the section itself. Consequently, considerable thought has been devoted to the subject, for the purpose of ascertaining whether there were or were not sufficient grounds to justify the continuation of the section as a separate division of the Association. It is felt by the present officers that the section has a definite function to perform, of immediate significance, though one, perhaps, which quite possibly may be by no means permanent. Immediately, however, it would seem that the Sociological Section can and should serve the rest of the Association in the following ways:

1. The working out, in coöperation with the Statistical Section, of standards and definitions for the collection, analysis and presentation of data in the social and health investigative fields.

* Various studies conducted through the coöperation of the Association for the Improvement of the Condition of the Poor, the Academy of Medicine, the Associated Out-Patient Clinics, the Society of Sanitary and Moral Prophylaxis. Most of the data has been published for distribution by the American Social Hygiene Association, 105 West 40th Street, New York City.

2. The incorporation in the program of the American Public Health Association of:

(a) Health problems for which there seems to be at the present time no logical place elsewhere in the Association.

(b) Health problems that might be and perhaps have been treated in other sections of the Association but which can best be presented in the Sociological Section because of the urgent necessity for particular emphasis upon the social and economic aspects of the problem, as for instance, the 1915 venereal disease symposium.

(c) Health problems which have not until recently been looked upon as of special public health significance, but which, from the point of view of prevention and social economics, need introduction to the Association as a whole, such as the Mental Hygiene symposium in the program for this year.

(d) Health problems now considered by other national organizations which may eventually become affiliated with the American Public Health Association and the program of which, through the contact point of the Sociological Section, may thus be presented to the members of our Association.

It would seem that until there is a more clean-cut demarcation of the public health field and until the process of amalgamation of private health association activities has been brought about, the Sociological Section can serve a useful purpose through the channels of exploration, introduction and specific emphasis, as outlined above. The members are invited to comment upon these conclusions and to communicate with the Association's Secretary, if moved to the expression of an opinion. They are invited to study, and if possible, take part in the program of the Sociological Section of the Cincinnati meeting which has been organized with the object of illustrating as effectively as possible the several functions tentatively adopted as the "platform" of the Section.

DR. JOSEPH HENDLEY TOWNSEND.

Members of the American Public Health Association and health workers in general will regret to hear of the death of Dr. Joseph H. Townsend, Secretary of the Connecticut State Board of Health. Doctor Townsend succumbed to pneumonia on January 7.

The *New Haven Register* has printed the following fitting editorial in memory of Doctor Townsend and his service:

"An eminently useful life, of which New Haven is justly proud, is brought to its earthly close, prematurely, we think, in the passing of Doctor Townsend. In a community which has had many distinguished members of his profession he has been conspicuous for his skill, his learning, his untiring enthusiasm for the cause of healing and public health. To the private practitioner the community owes much in a personal and intimate way—and Doctor Townsend had done his share of that sort of service. But he had an ambition and a capacity for a broader contribution to the common good, and in that he has achieved a notable eminence. His work for public health, in the community and in the state, will stand as the most abiding monument of Doctor Townsend's career, but as teacher, lecturer and writer he was still more widely known and will be long remembered.

"Many are the circles with which Doctor Townsend had been associated in his public career of thirty years, and in all of them he will be missed and mourned. He was a man of many parts, of broad sympathies and catholic friendships, and improved well his advantages for serving many men in many ways. All Connecticut has had the blessing of his life work, and all Connecticut pays tender and earnest tribute to a remarkable life."

WORKSHOP EDUCATION IN HYGIENE.

R. C. ROUTSONG,
National Cash Register Company, Dayton, Ohio.

Read before the Industrial Hygiene Section of the American Public Health Association, Rochester, N. Y.,
September 7, 1915.

In this paper Mr. Routsong outlines a comprehensive program for workshop education and hygiene. Mr. Routsong's experience in this matter makes his statement extremely valuable to industrial hygiene workers.

WORKSHOP education in hygiene is still in the early stages of development. Industrial organization attempting to improve the shop man and shop conditions find comparatively few examples of success. What to do and how far to go are still unsettled questions, and up to the present trained men have been lacking to carry out constructive programs to a successful conclusion. It is encouraging, however, to find a growing faith in the possibility of and enthusiasm for the conservation of man. When the task has been more clearly defined and men have been trained for the work, this faith and enthusiasm will bring a better industrial order.

From the collective standpoint, the education of the millions of men and women in industry is a stupendous task. From the standpoint of the employer and employees of the average individual shop, the task is now unduly complex or formidable.

Let us assume that the values in good housing (or factory construction) and good housekeeping have been appreciated, and that the employer has tenanted his building with well people.

He desires to teach them to be good housekeepers and good caretakers of their bodies.

To do this, five phases of industrial hygiene should have attention. These are fundamental and without them any attempt at workshop education will be only partially effective.

First, the suppression of infectious and contagious diseases. The employee should know that physical examination prior to employment, reexaminations, and constant medical supervision are the best means of guarding him against communicable diseases.

Second, personal hygiene in relation to diseases known to be associated with processes common to the manufacture of the product. Information regarding the prevention of tuberculosis, constipation, nervousness, are good and valuable, but how much better when given as part of the solution of the health problems of the tradesman—the painter, polisher, founder, printer. An intelligent and sympathetic grasp of the health hazards of a trade is a vital factor in the reduction of its hazards.

Third, personal hygiene in relation

to diseases resulting in lost time and decreased efficiency. These diseases should be known and their remedies clearly stated. Both employer and employee are benefited by knowing what the causes of lost time are, as this forms a substantial basis for educational work the advisability of which is above question.

Fourth, there must be a proper appreciation of sanitary working conditions and first aid equipment. The employer who has exerted every effort to keep his lavatories and rest rooms clean is in the best position to solicit his employees' coöperation. Campaigns against spitting, untidiness, intemperance, will be more effective when the management has set the example. It should be the employer's privilege to explain what sanitary conditions and first aid equipment really are, and how and why they should be maintained.

Lastly, it is not going too far afield to discuss with the workman the problems of home hygiene. These discussions should include food, its kind, preparation, and how it should be protected by the housewife and through community regulation; home sanitation, including such matters as cellars, heat, ventilation and plumbing, sleeping arrangements, and the like. To neglect some of these things is to neglect one of the most important causes of physical inefficiency and breakdown, because the home life of the worker, together with his habits, do more to impair his efficiency than even the worst conditions in the average factory today. And, furthermore, the trend of legislation seems to be towards

sickness insurance for which the indemnity shall be paid jointly by employer, employee and the state.

Whatever is attempted within the workshop, should be done only after careful analyses of the health problems of the plant have been made. We should then attack those problems known to involve keeping men from earning the living to which they are entitled, shortening their period of usefulness and leaving their machines which turn out the product idle or in untrained hands. To carry out any campaign of workshop education in hygiene the following are suggestions for directing it to a successful conclusion:

1. An organized department, call it welfare or what you will, the sole purpose of which will be to study the needs of the shop and meet them. If a department is not feasible, a good substitute is a committee employing a secretary, who shall be a factory inspector, giving his entire time to the work. The objection to a committee without a secretary devoting his entire time is that such important matters as the committee will have to deal with cannot be left to men who are interested primarily in production or selling. These men have not as a rule the time to devote to the details which in this movement are so important.

2. A plant physician or physicians and visiting nurses. It is important that the physician give his entire time to the plant. He can do his best work if the health of the employees is his sole consideration and he has no private practice to build up or maintain. The visiting nurse can do the practical

home educational work with members of the employee's family and by her offices can establish a personal relationship which is so essential to the success of the movement.

3. Industrial health records. These should locate and define the health problems of an industry so that the employer and employee may see them at a glance. We suggest that a survey be made of all departments for industrial health hazards, the results to be charted on a drawing of the plant. Polishers, grinders, platers, buffers, etc., should be included. The causes of time lost should be brought out clearly in departmental health and accident records. A tabulation of medical examinations of old and new employees and cases coming voluntarily to the emergency hospital will make the problem still more clear and definite. The work of the visiting nurse should not be overlooked. Providing she is tactful, sincere and efficient, a record of her work will be of much value to the employer who is interested in the welfare of his men and women, their homes and the community in which they live.

4. Bulletins are most important. These tell a story simply and quickly. They should never carry more than one idea.

5. Plant publications. Weave into them health hints and pertinent facts based upon conditions found in the factory and the community. Brief descriptions of communicable diseases may be included provided these descriptions are told in simply everyday language.

6. Let the weekly pay envelope

contain a sentence or two of some simple fact of shop or personal hygiene.

7. Lectures. Illustrated lectures, either during working hours or after, are extremely good means of bringing home the elements of factory and personal hygiene. The lectures, to be successful, should be exceedingly simple; all technical terms being avoided, and, in so far as possible, every statement illustrated. The subjects covered may well be those which vitally affect health and efficiency; such subjects as the care of the teeth, cleanliness, foods (milk, meats, and others), exercise, diseases, home sanitation, can be given to advantage. Last year my company gave to all our employees, on company time, three illustrated lectures; air or respiration and circulation, food, covering digestion and some of the diseases of the digestive organs, and venereal diseases. These lectures were illustrated by slides and moving pictures. All through, the emphasis was put upon the delicacy of the human machine and the necessity of giving heed to the great laws of nature.

Whatever the particular line of education attempted, and each factory has its own problems, education must begin at the top. It is futile to expect the rank and file to listen, or to do, if the majority of those in authority are not themselves sympathetic with the work being done. The first step, therefore, is the educating and arousing the coöperation of all officers down to and including the job-foremen. When this is done, the endeavors will not be looked upon as mere fads or whims of some cranks "higher up." Then, too,

the work will assume the characteristic it must have for success, namely, the personal equation. One of the great needs of our large industries today is to make relationships more personal. I know of no means more promising of good results than a sane program of

education in hygiene, worked out by a systematically organized department, disseminated by bulletins, publications, and lectures; and finally driven home by the personal interest of physicians, visiting nurses, job-foremen, foremen, and all those in authority.



TUBERCULOSIS CAMPAIGN SPENDS \$22,500,000 IN 1915 AS AGAINST \$5,000,000 IN 1905.

Figures indicating the growth of the anti-tuberculosis campaign in the United States show that in the year 1905 about \$5,000,000 was spent in this movement while during the year 1915 over \$22,500,000. These figures are part of the annual statistical statement of The National Association for the Study and Prevention of Tuberculosis published today. The statement is based in part on actual reports received from anti-tuberculosis agencies throughout the country and in part on estimates made by the Association.

In 1905 probably less than \$100,000 was spent for anti-tuberculosis work other than the care of tuberculosis patients in a few poorly equipped sanatoria and hospitals. In 1915 over 1,400 anti-tuberculosis associations spent nearly \$1,225,000 in organization and education. Special tuberculosis dispensaries, of which there are 450, spent over \$1,150,000 in examining, advising and treating patients. Open air schools, of which there were none in 1905, spent more than \$350,000 in teaching and treating anemic and tuberculosis children, while nearly \$750,000 was spent in the care of tuberculous insane and prisoners. Sanatoria and hospitals for the care of consumptives, nearly 600 of them, spent \$19,250,000. Much of this

sum was contributed by private, pay-patients, but the greater part, over \$12,000,000, was paid by federal, state, city and county boards for free treatment.

As an indication of the way in which the burden of the care of consumptives is being shifted to the public's shoulders, where it rightly belongs, the National Association points out that in 1905, as nearly as can be estimated, less than 25 per cent. of the total expenditure of \$5,000,000 for tuberculosis was from public funds, while in 1915, nearly 65 per cent., or \$14,500,000, was from this source.

New York State again leads the states with the largest total expenditure of nearly \$5,000,000 with Pennsylvania second, and Illinois third. The following table shows the relative public and private expenditures in each of the five leading states:

EXPENDITURES IN 1915.

State.	Public.	Private.	Total.
New York. . .	\$3,193,415	\$1,751,096	\$4,944,511
Pennsylvania	2,172,711	534,722	2,707,433
Illinois.	1,558,644	902,314	2,460,958
Massachusetts	1,349,033	357,510	1,706,543
Colorado. . . .	97,500	862,765	960,265

INVESTIGATION INTO THE RELATIONSHIP OF FLIES AND DIARRHEAL DISEASE IN CHILDREN UNDER ONE YEAR OF AGE IN NEW YORK CITY.

PHILIP S. PLATT, M. A.,

*Superintendent Bureau of Public Health and Hygiene Department of Social Welfare,
New York Association for Improving the Condition of the Poor.*

Read before the Public Health Officials Section of the American Public Health Association, Jacksonville, Fla.,
December 1, 1914.

SINCE the last meeting of this Association, the Bureau of Public Health and Hygiene of the New York Association for Improving the Condition of the Poor has reported in the AMERICAN JOURNAL OF PUBLIC HEALTH for March 1914 upon its first year's study of the relationship of flies to disease. In that report the continuation of the study along similar lines was promised. The present paper is a description of the investigation undertaken in the summer of 1914.

It is sixteen years since the prevalence of typhoid in the American military camps brought to a focus the danger of flies. Much significant activity against the fly has been seen here and abroad since that time. The abolition or screening of privies, the disinfection or removal of manure and other sources of breeding, the prevalence of anti-fly campaigns, are familiar activities on every side. Sanitation, clean-ups, fly campaigns have been rife, and, to be sure, the sickness and death-rates have fallen.

The problem is one in which loose reasoning and easy assumptions have been the rule rather than the exception. Little if any serious attempt has been made to measure the effect upon the fly problem of such important

influences as the sanitary condition of the home, type of feeding and the like. The fly has often been given the credit of the combined influences of these several factors. Is the fly as important in clean homes as in dirty homes? What is the influence of flies and "dirt" combined? Are either equal in importance to artificial feeding? Such questions are fundamental to any study of the fly. Relative sanitary values are of the utmost importance.

As a potential mechanical transmitter of the majority of communicable diseases the fly has few equals. So ubiquitous and omnivorous an insect has unrivalled opportunity to accumulate and disseminate infectious matter. But just what share the fly has, under ordinary conditions, in conveying disease, we have only scant information. For every community this percentage of the total sickness transmitted by the fly would, of course, be different. It could not be the same in Jacksonville, in Nome, and in the crowded tenements of New York. So far most of our information on this subject has come from the South. For our northern cities like New York, sewered but densely crowded, we have little accurate knowledge.

If the health officers in the North are

to determine accurately what results can be accomplished with the resources at their disposal there is an ever greater need of carefully controlled measurements of such sanitary problems as the importance of the fly. Without a sense of proportion regarding sanitary values, an indictment against the fly, whether light or heavy, is of dubious significance.

It was with the intention of determining the influence of the fly under these carefully controlled northern conditions that the Bureau of Public Health and Hygiene jointly with the Bureau of Child Hygiene of the Health Department devoted the summer of 1914 to an intensive study in the homes of over a thousand infants. As previously reported, its experiment of the summer of 1913 showed that three times as much diarrhea occurred among those of all ages in a fly-exposed, unsanitated area as in a fly-protected, cleaned-up area. No attempt was made to isolate or measure separately the several influential factors and the results consequently were accredited to flies and other insanitary conditions combined, rather than to flies alone. Recognizing the preliminary nature of this study and the need of substantiation by more delicate methods and more careful control, the present three months' study was planned.

THE CENSUS.

Three districts, one predominately Italian, the second Jewish, the third Irish, were chosen chiefly on account of their high diarrheal mortalities, congestion and typical tenement house

conditions. The two former may be described as flanking Manhattan bridge on the lower East Side, the latter on the West Side, as in the heart of Hell's Kitchen. Each district covered about eighteen square blocks.

In each district a canvass was made by trained nurses of 400 families containing an infant under one year of age. Detailed information about the family, the condition of the home, the care of the baby and the degree of coöperation promised by the mother in a fly campaign, was recorded in each instance. The 1,200 families were then divided at once. In one group the special fly-protective measures were to be enforced; in the other group the absence of such measures would enable it to serve as a "control." Great pains were taken to make the two groups entirely comparable. Many conditions were taken into consideration in this division; namely, the size of the family, the care of the infant, the promise of future coöperation, the possession of fly netting for the baby's protection, and the presence of sick or delicate children, of which there were 6 per cent.

Twelve nurses and three supervisors composed the force which visited each home every five days for three months. Such a force was beyond the means of the Bureau, and had not most generous coöperation been given by the Health Department in the form of six Department nurses, it would have been impossible to conduct the study on so large a scale. From many sources the Bureau has received most generous coöperation and advice. To all who have assisted, and especially to Dr. William H. Park,

Director of the Health Department Laboratories, the Bureau expresses its sincere appreciation.

PROTECTIVE MEASURES.

Immediately the question arises as to the nature of the protection. At first thought, screening of windows occurs as the chief if not the only protective measure of importance. It was upon this point that the experience gained in our study of the previous summer was of very practical value. For the women of the lower East Side, a window possesses an importance of the first magnitude, and the suggestion of screening a window in such a way as to curtail ever so slightly its important social function will not readily be entertained. However, even if the screens were properly used and cared for, the influence which they would exert on the children from one to five, who are so largely in the streets and eating all kinds of street food, is probably not great. Consequently, it was decided that no attempt would be made to protect the children from one to five years of age, but that every effort should be concentrated on the infant under one year of age. The infant in its carriage or its go-cart, cradle, or bed, can be effectively protected against the fly by the proper use of netting. It was upon this that the greatest emphasis was laid. The insistent demand was that the netting must be over the baby. In order that there would be no tax upon the slim resources of these families, the Bureau provided the netting. About 1,000 yards of netting were thus distributed.

Hardly less vigorously were the

covering of food, the removal of food scraps, the washing or covering of soiled diapers, etc., urged upon the families.

More to keep the fly in mind than to reduce its number, Tanglefoot fly paper was distributed weekly. Several carefully prepared types of fly literature, richly illustrated with effective cartoons, became another means of reaching the families in which protective measures were taken. Finally the importance of the visit of the nurse and the supervisor must not be underestimated. From thirteen to twenty-two visits were made to each family during the eleven weeks of the experiment. Instruction, admonition, encouragement and constant teaching of the mother how to protect her child, was a part of the nurse's contribution.

On the other hand, in the so-called unprotected or "control" group, the special measures with which the fly was combated, were not emphasized. Netting, literature, and fly paper were not distributed, though the nurses made an equal number of visits. In making these visits the nurses, while not dwelling upon the fly, observed all the conditions existing in the home and gave the usual sanitary and hygienic instruction customary to the Health Department nurses. Of course, when any case of sickness was discovered, regardless of the group, every effort was taken to restore the sick one to health. Children with diarrhea were sent to the milk stations for further diagnosis and treatment.

Inspection cards were filled out at every visit, record being made of the condition of the child, of the home,

of the nature of the child's feeding, character of milk supply, presence of flies, of food exposed, etc. Moreover, the supervisors also reported conditions found and thus provided a check on the nurses' reports. It was upon these reports that the final classification of the infants was made.

PLAN OF ANALYSIS OF STUDY.

At the close of the field work on September 15, the files contained some 18,000 observations upon some 1,200 infants. Included in these were several hundred regarding whom there were insufficient reports, owing almost entirely to the removal of the families from the neighborhood. As many as 200 cases were thus dropped. Those remaining had a minimum of eight visits and all had been under observation at least two months.

Early in the experiment it became evident that the division of 1,200 families into two similar groups, one in which the infant was protected against flies and the other in which flies were disregarded, created too arbitrary and inelastic a distinction to be successful. Within any group of such dimension there must be allowance for individual variation. Within the protected group the best and the poorest degrees of co-operation were found, and in the "control" group there were to be found those who were protecting the infant against the fly in a thoroughly creditable manner. Our observation in the matter was later substantiated by comparison of the diarrheal rates expressed in terms of the percentage of infants attacked by diarrhea, for the two groups. The protected group as

such had a rate of 22.5 per cent., while the "control" had a rate of 20.5 per cent.—a result which gives little encouragement to the idea that real co-operation can be expected throughout a large group.

It was realized, of course, that the classification of each infant according to its particular degree of fly protection must be done with the greatest care and accuracy, else the results of the experiment would be of little worth. A method which allowed a maximum degree of reliability and the minimum of error was found. Upon the basis of the percentage of actual observations of netting over the baby, the netting efficiency and the degree of protection of the infant could be classified without depending upon any unstandardized personal impressions. The only ground for criticism existed in deciding what percentage of observations should determine good fly, fair fly, and poor fly protection. In view of the many conditions which in themselves made it impossible that the netting should always have been over the infant, such as during feeding, bathing, or while in its most active waking period, it is obvious that the netting could not always have been observed, even though the best protection was practised. After careful consideration, 40 per cent. or greater of positive observations was decided upon as the range for good protection, between 10 per cent. and 40 per cent. fair protection, below 10 per cent. poor protection. In this way, it is believed, an accurate classification has been obtained.

Similar methods were used in classifying the infants according to the san-

itary condition of the home, and type of feeding. By the very nature of the groups, however, the classification of the clean, fair and dirty homes cannot claim the same degree of reliability as is claimed for the fly-protection groups. In the first place, the judgment of the nurses necessarily played a large part, and such judgments do not allow of the most careful standardization. Furthermore, for various reasons a weekly observation on this point was not demanded, and the classifications are based chiefly on a general summary of the home conditions, provided by the nurses towards the close of the experiment, amplified by the detailed statement on the census card, the information frequently given voluntarily by the nurses, and the impressions of the supervisors. Where the information was considered insufficient, the card was placed in the unclassified group. Infants were classified as breast fed or artificially fed when 80 per cent. or more of the observations of the nurses were so recorded. When the percentage was lower than 80 per cent., as for instance, when 50 per cent. were breast, 30 per cent. artificial and 20 per cent. mixed, the case was classified as a mixed feeding case.

Age and nationality were two further sub-classifications. The age of the infant is that given by the mother at the time the census was made. The nationality of father and mother, due to the extensive international marriages, is frequently not the same. The policy of determining the nationality of the offspring by the nationality of the mother, which has been used by

the United States Census Bureau, is here employed.

After each infant had been classified according to the groups before mentioned, all the information recorded by the nurses during the twelve weeks of visiting was transcribed in such form as to give a complete history of the condition of the experiment week by week. The weekly observations regarding netting over baby, and over go-cart, the type of feeding, exposure of milk, prevalence of flies and condition of the infant was summarized. The comparative efficiency of observation of the nurses could then be noted.

Particular care was taken with the reports of sickness. These were carefully reviewed and correctly classified by Dr. Anna von Sholly of the Health Department, under whose immediate control were the nurses during the field study.

THE SEPARATION OF THE NURSES INTO TWO GROUPS.

Unfortunately, in an experiment of this nature, the quality of the work performed by a number of nurses is not likely to be of exactly the same standard. Close association with and careful supervision of the nurses necessarily gave the supervisors definite impressions in regard to the character and quality of their work. Feeling that the standard of accuracy of the study demanded a careful consideration of the possible unreliability of the work of some of the nurses, they were eventually divided by the supervisors into two groups designated as Selected nurses and Non-selected nurses, and

thereafter kept entirely separate. Each group consisted of three Bureau and three Health Department nurses. The separation was made at the close of the experiment, before any analysis of results was begun, and was based on the observations of the supervisors that the Non-selected nurses showed less conscientious interest in the experiment, and the records of their work were considerably less complete. Furthermore, when the comparison of the actual work of the two groups of nurses was made, the general impression regarding the nurses was substantiated, the Non-selected nurses making 14 per cent. fewer visits. Analyzing the diarrheal rates obtained by the two groups of nurses, marked inconsistencies were found not only between the two groups, but also within the Non-selected group itself. Moreover, the diarrheal rates of the Non-selected were lower in every instance, notwithstanding the similarity of the groups in practically every respect.

The exclusion of their work from equal consideration with the Selected nurses' work was then seriously considered, and the Bureau decided that while the work of the Selected nurses warranted separate interpretation and special emphasis, all the data should be presented and modified conclusions be drawn if necessary from the combined results. Lack of space, however, makes it quite impossible to present all these data, consequently, only the tables of the Selected nurses are given, with brief discussion.

By reference to Table I, Selected nurses, it will be noted that 22 per cent. of the infants in the good protec-

tion group had diarrhea, and 41 per cent. of the infants in the poor protection group. The method of measuring the influence of flies is that of dividing 41 per cent. by 22 per cent.,

RESULTS.

TABLE I—SELECTED NURSES.
FLY PROTECTION.

	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar.	
			No.	Per cent.
Good protection..	254	53	57	22
Fair protection...	185	39	45	24
Poor protection ..	41	8	17	41
Total.....	480	100	119	25

Fly factor..... 1.9

whereby we have a factor (1.9) telling how much greater was the diarrheal rate in the one condition than in the other. *It may be said then that almost twice (1.9) as many infants had diarrhea among the fly-exposed group as among the fly-protected group.*

It will be natural to inquire at this point whether the diarrheal rates which are given for the good, fair or poor fly protection groups are really exclusively attributable to the protection, or whether other influences such as dirty homes, or artificial feeding may not be largely responsible for the high rate found, for instance, in the poor protection group? This question was examined with care, and the tests applied indicate that while occasionally a slight correction may be neces-

sary, as a rule, especially in the measurements of main factors, other conditions do not influence the results sufficiently to affect the conclusions. It is obvious that the size of the experiment does not permit the use of highly specialized statistical methods by which every contributing influence can be accurately measured, but by the available methods, namely, the elimination of any condition, such as artificial feeding, from the good protection and the poor protection groups, assurance may be had that the factor is not appreciably altered. While it is impracticable to discount the age influence in every case, it appears from careful scrutiny of the subgroups that the age factor is not of such importance as materially to affect any conclusions. It should be considered also that the summer had no intensely hot periods and that there was some supervision of the food.

TABLE II—SELECTED NURSES.
FLY PROTECTION ACCORDING TO
CONDITION OF HOME.

	Good protection.			
	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar.	
			No.	Per cent.
Clean.....	55	22	10	18
Fair.....	55	22	13	24
Dirty.....	28	11	7	25
Unclassified.....	116	45	27	23
Total.....	254	100	57	22

"Dirt" factor..... 1.4

	Fair protection.			
Clean.....	22	12	4	18
Fair.....	39	21	11	28
Dirty.....	26	14	8	31
Unclassified.....	98	53	22	22
Total.....	185	100	45	24

"Dirt" factor..... 1.7

	Poor protection.			
Clean.....	1	2	—	—
Fair.....	5	12	2	40
Dirty.....	18	44	8	44
Unclassified.....	17	42	7	41
Total.....	41	100	17	41

"Dirt" factor.....

	Good, fair and poor protection.			
Clean.....	78	16	14	18
Fair.....	99	21	26	26
Dirty.....	72	15	23	32
Unclassified.....	231	48	56	24
Total.....	480	100	119	25

"Dirt" factor..... 1.8

Table II, Selected nurses, gives the data regarding the sanitary condition of the home, as observed under good protection, fair protection, and poor protection. The fourth section of this table combines the three preceding sections, so as to show only the sanitary condition of the home. Considering first this portion of the table it will be noted that the clean and the dirty homes are in about equal num-

ber, but the percentage of infants attacked by diarrhea is markedly different, viz., 18 per cent. for the clean and 32 per cent. for the dirty homes, or 1.8 times as many "diarrheal" infants in the dirty homes as in the clean homes. The infants in the fair (medium) homes and the large unclassified group occupy an intermediate position.

The significance of the so-called "dirt" factor should be carefully considered. Of course, the classification of the homes according to cleanliness or dirtiness is based on the objective appearance of the home. Objectively, a dirty home is one in which the visitor finds the remains of a meal on the table or in the sink, dirty clothes lying about, abundant evidence of dust and dirt, and the general appearance of slovenly house-keeping. Subjectively, a dirty home probably means that the mother is of a careless, easy-going disposition, lacking in pride and satisfied with the minimum standards of decency. Associated with these characteristics, a lack of systematic care of the infant, irregular and improper feeding and other unfavorable influences on the infant are likely to be found. With this in mind, and not before, the significance of the "dirt" factor may be grasped. Probably the dirt itself is of only moderate importance; it is used here only as a symbol of a combination of inferior qualities on the part of the mother, and unfavorable conditions in the home. Obviously, the reverse of these characteristics, objective and subjective, are to be expected in the clean homes.

Careful inspection of the last column of figures will show that the percentage of infants attacked by diarrhea within each protection group rises according as the home conditions become unfavorable. Also, a marked increase of rates for similar conditions of home is observed when the various degrees of protections are compared. There is a marked consistency in the increasing rates among these twelve classifications with the exception of the poor protection, clean homes group, which is so small as to be negligible.

While the artificially fed infants may be eliminated from the clean homes and the dirty homes without altering the "dirt" factor of 1.8, the same is not strictly true of the influence of poor protection. This, however, is largely owing to the absence of infants in the clean homes of the poor protection group. Had this group of clean homes a normal size and a consistent diarrheal rate, the "dirt" factor would probably be unaffected.

It may be said, however, that almost twice (1.8) as many infants had diarrhea in the dirty homes as in the clean homes. From this it appears that flies and so-called "dirt" are equally important in favoring diarrhea among infants.

The fly factor and the "dirt" factor, which have been discussed singly, may here be studied together. For instance, the diarrheal rate (41 per cent.) for the poor protection, dirty homes group may be compared with the rate (18 per cent.) for the good protection, clean homes group. This

gives a factor for the flies and "dirt" combined of 2.4, a measurement which is the same as that of artificial feeding.

TABLE III—SELECTED NURSES.
FLY PROTECTION ACCORDING TO
TYPE OF FEEDING.

	Good protection.			
	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar.	
			No.	Per cent.
Breast fed	180	71	36	20
Mixed fed	51	20	11	22
Artificially fed . . .	23	9	10	43
Total	254	100	57	22

Feeding factor 2.2

	Fair protection.			
	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar.	
			No.	Per cent.
Breast fed	131	71	26	20
Mixed fed	34	18	9	27
Artificially fed . . .	20	11	10	50
Total	185	100	45	24

Feeding factor 2.5

	Poor protection.			
	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar.	
			No.	Per cent.
Breast fed	22	54	8	36
Mixed fed	16	39	6	38
Artificially fed . . .	3	7	3	100
Total	41	100	17	41

Feeding factor 2.8

	Good, fair and poor protection.			
	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar.	
			No.	Per cent.
Breast fed	333	69	70	21
Mixed fed	101	21	26	26
Artificially fed . . .	46	10	23	50
Total	480	100	119	25

Feeding factor 2.4

Table III, Selected nurses, presents in similar fashion the data concerning fly protection and type of feeding combined. Observing the last column of the fourth section of the table the association of a high percentage of diarrheal infants with artificial feeding will first be noted, the percentage being 50 per cent. as contrasted with 21 per cent. for the breast fed. *This indicates that almost two and a half times (2.4) as many infants had diarrhea among the artificially fed as among the breast fed.* It also indicates that artificial feeding is more important than either flies or dirt. In the three preceding sections of the table the percentage of "diarrheal" infants under each degree of protection increases according as the feeding is breast, mixed or artificial. Likewise the increase in the diarrheal rates for each type of feeding, according as the protection against flies is good, fair or poor, is very marked. It is unfortunate that the poor protection, artificial feeding group is so small, otherwise an interesting measurement of the importance of flies and artificial feeding could have been made by comparing the diarrheal rate with that of the good protection, breast-fed group.

It is because of this very considerable importance of artificial feeding that it is essential to determine to what degree this influence figures in causing the high rates attributed to poor protection or dirty homes. In addition to the method previously discussed, there is another method by which the influence of artificial feeding in determining the other factors may be shown to be necessarily small, so small in fact that it cannot invalidate the results. It will be seen that the artificially fed group is small in number, only 10 per cent. of the whole, while the breast fed group constitutes 69 per cent. of all the infants. Consequently, if the same proportion existed in all the subgroups, the influence of artificial feeding, with its higher diarrheal rate, could never be large, and it is a fact that the distribution of the artificially fed rarely exceeds 10 per cent., except in the older age groups.

The smallest groups used in determining a factor has been in the group of artificially fed infants in dirty homes where 9 infants with a diarrheal rate of 56 per cent. have been compared with 55 breast-fed infants in clean homes, with a diarrheal rate of 16 per cent., giving a factor of 3.5. A measurement based upon so few cases is not of course of great value, particularly when the very considerable influence of poor fly protection is not discounted. If the artificially fed infants in dirty homes under poor protection are eliminated the factor is reduced to 2.7. The artificial feeding factors show a gradual increase as the three degrees of protection are con-

sidered; viz. 2.2 for good, 2.5 for fair, and 2.8 for poor protection, with an average for the three degrees of protection of 2.4.

TABLE IV—SELECTED NURSES.

	Total No. infants.	Per cent. distri. infants.	AGE.	
			Inf. attack by diar.	
			No.	Per cent.
0-3 Months ...	151	32	29	19
4-6 Months ...	120	25	30	25
7-9 Months ...	118	24	32	27
10-12 Months ...	91	19	28	31
Total.....	480	100	119	25

In considering, in the simplified form of Table IV, the distribution and diarrheal rates of the infants according to age, an interesting condition is observed. The percentage of infants 0-3 months of age is the largest of the four age groups while the percentage of infants having diarrhea is the lowest. Each succeeding age group has a smaller percentage of infants, and a higher diarrheal rate. The increased influence of artificial feeding with accompanying decrease of breast feeding partially explains this. For instance, although not shown in any of the tables, the percentage of artificial feeding for the four age periods is 3, 7, 14 and 18 per cent. respectively and that of breast feeding 80, 73, 64 and 54 per cent. respectively. With this exception, the distribution of the age groups among other groups

may be said to be such as not to give undue weight to the age factor. The question of age influence is, however, especially subtle. Before trustworthy conclusions can be drawn many influences should be carefully considered. The nature of the experiment, however, does not permit of such detailed analysis.

TABLE V—SELECTED NURSES.
NATIONALITY.
(Grouped according to mother's.)

	Total No. infants.	Per cent. distri. infants.	Inf. attack by diar.	
			No.	Per cent.
American	13	3	4	31
Austrian	14	3	3	21
Irish	16	3	3	19
Italian	182	38	27	15
Jew	228	48	75	33
Polish	10	2	6	60
4 Other National.	17	3	1	6
Total	480	100	119	25

Of the six chief nationalities, the smallest group had the highest percentage of children attacked by diarrhea, viz. the Polish with 60 per cent. The next highest rate, 33 per cent., is that of the largest group, viz. the Jewish which constitutes 48 per cent. of the total number in the experiment. The term Jewish has been used somewhat loosely here, as constituting those whose mothers claimed Jewish, Russian, and Russian-Jewish nationality. The Americans come next in diarrheal rate (31 per cent.), although but a small part (3 per cent.) of the

total number. The Austrian and Irish are next in order, with the Italians, the second largest group (38 per cent.) possessing the lowest diarrheal rate (15 per cent.). It is felt that great emphasis should not be placed on these nationality rates, with the exception of the Italian and the Jewish. The former are predominately clean and well protected, while the latter, though no less favorably placed as regards feeding, are more largely represented in the dirty and poorly protected groups. Here the figures are sufficiently large to say with some degree of accuracy that the Jewish infants are on the whole less favorably situated than the Italian. In the Jewish group 2.2 times as many infants had diarrhea as in the Italian group.

CONCLUSIONS.

While a full discussion of the combined tables representing the 921 infants in the study would be desirable, it is impossible to do more than to give the main factors as measured, and refer the reader to the report of the study to appear as Publication No. 91, where the tables will appear fully discussed. The main factors for the combined group of nurses are as follows: Fly, 1.4; "dirt," 1.8; artificial feeding, 2.4; flies and "dirt," 2.1, artificial feeding and "dirt," 3.5.

These differ from the factors obtained by the Selected nurses in only one appreciable particular, namely, the fly factor, and is undoubtedly owing to the absence of sickness among the poorly protected, artificially fed infants of the Non-selected group,

which elsewhere appears to suffer heavily.

As before stated, the conclusions, as based upon the work of the Selected nurses, have been given the major emphasis by the Bureau. The factors as measured are, fly, 1.9; "dirt," 1.8; artificial feeding, 2.4; flies and "dirt," 2.4; artificial feeding and "dirt," 3.5. These speak for themselves. Flies and "dirt" appear to be about equally important and practically double the amount of diarrhea which exists under the more favorable conditions. As measured together, their importance

is still greater, equalling that obtained for artificial feeding, although this would probably have been higher if the milk supply had not been rather carefully supervised. Still greater in importance, though the measurement is less reliable than the preceding, is that of artificial feeding and "dirt" combined. The importance of all these conditions in the incidence of diarrheal disease among infants in New York City in the summer of 1914 is clearly established and the necessity for serious attack upon them is apparent.

Discussion.

DR. E. C. LEVY (*Richmond, Va.*): Whatever those health officers who live in northern sections of the country may believe as to the relation between the fly and certain diseases, we in the South know from observation and not because we are carried away by any fad, that this is a very real thing and a very big thing. It is utterly impossible to tell you in a few minutes why I personally believe it. But I will tell you one or two reasons and will confine myself to the single question of two diseases, typhoid fever and infantile diarrhea. I want to state very plainly that I do not believe we are able entirely to differentiate the spread of disease through flies and through other agencies which are capable of distributing human excrement, but with us in the South it is undoubtedly through that that typhoid fever is largely spread in cities, from the excreta of cases than from carrier cases in the community. I came to that conclusion after being health officer one year and read a paper on the subject at Winnipeg a good many years ago, in 1908, and it took a whole lot of courage to read that paper, too. For two years we tried in Richmond, after I came in office, to reduce typhoid fever by all the orthodox measures at that time, and did not reduce the typhoid death-rate significantly, but just as soon as we began to realize that human excrement in the community was the chief cause of

typhoid fever, we got results at once, and the typhoid death-rate was cut down to just half of the lowest it had ever been before, and the water supply was entirely unchanged, and for the past six years in Richmond our typhoid death-rate has been constantly going down from an average of 78 deaths per hundred thousand for 26 years to an average of well under 20 for the last six years. Of course the latter rate is a rate that northern sanitarians should not be contented with, or southern either, but it represents far more to those of you who live in the North. As to infantile diarrhea, the parallel is almost perfect. I tried to test that out in a less thorough manner than the author has been able to do it, but one of the first things I did was to put three medical students in one district of the city where I was told infantile diarrhea was prevalent every year. These young men went over 35 blocks three times, having a general cleaning up of all such materials as could breed flies, and that year we had only three deaths from infantile diarrhea in that section, and one died one day after these young men got to work; only two died after that. I wish to say one word very closely correlated; that is, within the past three years in Richmond I have worked in connection with infantile diarrhea along the same line, of its being largely contagious, more by the materials being in the stool than there being carrier

cases, because here were these infants—it has heretofore been overlooked that you have a large part of the populace distributing human excrement in spite of being connected with sewers, namely, the babies. The advice to clothe very scantily indeed is carried to extremes in the hot summer months and in some instances they are not clothed at all. The diapers of the baby remain around with that dangerous material, so for the past three years the nurses have been told that, in instructing the mothers in the care of their babies, to emphasize over and above any other thing the care of the diaper and not to lessen their instructions on feeding and all those things, but to emphasize this above everything else. The result has been this, that in spite of good milk for five or six years, in spite of instruction by the nurses for two years, our

annual death-rate from infantile diarrhea for two years averaged 134 per 100,000 inhabitants and the lowest rate was 122, the highest rate being 152, and it was in the year when the milk was better than ever and the nurses more numerous and better accustomed to their work. As soon as the other instruction was added, the care of the babies' excrement, the death-rate fell to 101 in 1912, and last year to 84, and this year we can still have four deaths more and not be as high as 75, a low mark of between 70 and 75 against a low mark of 122 and a high mark of 152. Now flies come in as one of the instruments by which this babies' excrement is carried from baby to baby and from house to house. It is exceedingly interesting, but I do not wish to take up more of your time by telling about it.



INCREASING DEATH-RATES FROM ORGANIC CAUSES.

Remarking the fact that in his community "deaths in those age-groups ordinarily affected by the preventable, communicable diseases are on the decrease, while those," in the upper age-groups, "affected by organic disorders are increasing at a surprising rate," Mr. F. J. Osborne, health officer of Orange, N. J., comments in his latest annual report as follows:

"Obviously these facts would carry more weight were the figures at hand giving the exact distribution of our population into age-groups, but we have no reason to suppose that Orange would attract a population made up essentially of young people in the prime of life, for this is an old residential city with no particularly attractive line of employment. Nor has there been any change in the general composition of the city in this respect during the years under consideration. It is, however—being a suburb of the country's greatest metropolis—peculiarly well situated for the action of those causes ordinarily given as contributing to the high mortality from organic diseases of the heart, liver, kidneys, and nerve centers. Some of these causes are alcohol, tobacco, drugs, and the alleged increase in the venereal diseases. Probably a more convincing argument could be formulated on the basic principle of maladjustment of our general living to the new conditions con-

sequent upon nineteenth and twentieth century prosperity, with its sedentary life, excessive nerve strain, and thoughtless intemperance in matters relating to eating, drinking, working and playing. This seems more reasonable since this high mortality in the organic diseases seems far more pronounced in this country than in Europe. But whatever the causes may be, and however much we may dodge the issue by declaiming about our decline in general death-rate, the fact still remains that this abnormally high mortality in the age period beyond 45 years of age, due to organic diseases, is with us, is of comparatively recent date, is increasing annually, and merits the attention of all who may be interested in postponing the time of death. No saner suggestion seems to have been made than that each individual, at least those beyond the prime of life, say 30 years, should consult a reliable physician periodically for a complete physical examination of all the vital organs and functions of the body, in order that early precautions may be taken before the disorder becomes chronic."

Since the phenomenon mentioned has been also noted in other communities, these remarks, though not altogether novel, have an especial suggestive value in calling attention to a mortality problem of constantly increasing importance.

RURAL SANITATION.

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THE sanitary problem of our rural districts differs widely from that which confronts the health authorities of the cities. People in general consider that the country places offer better advantages to health than do the cities, and this belief is fostered by those who have charge of our bodies when they are afflicted—the invalid, the neurasthenic, the aged, the young mother, the tired business man, the sickly youth or maiden are advised to seek the rest and quiet, green fields, fresh pure air, and wholesome food which can be obtained only in thinly settled communities; but if we would believe only the half which some health officers say about the country and the farmer we must needs regard the rural districts veritable death traps and the farmer a Lord High Executioner.

Often articles written by some city health officer or sanitary expert appear in our daily papers or monthly magazines, especially in medical and sanitary journals, and in health reports, charging nearly all the ills and ails to which our poor bodies are subject at the door of the farmer or else these articles call attention in a loud voice to the unsanitary conditions obtaining on the farms and utterly neglect the most flagrant violation of all sanitary rules within their own city and possibly within a few feet of their domicile or office. In meetings of health officials or societies, papers dealing with some

feature of rural hygiene will surely be presented but there will be grim silence on city sanitation. The rural districts, to my mind, need no defence, for, if there be a locality wherein one can live as our Maker intended, that place is the country. Let us consider briefly some of the conditions we find in the country and compare them as best we may with their analogues of the city.

One of the first and most important problems is that of housing and here the rural districts by far excel the city. The rural population is, with few exceptions, native American and these exceptions are of the best type of immigrants coming to this land. Thus in the very beginning are eliminated those peoples who are prone to overcrowd in their homes and who in groups of three or more families live in a space insufficient for even one family. The farmer's house is built for and occupied by one family and very hard to find is the farmer's home in which sufficient room is not provided for each member of the household; the rooms are light, airy, well ventilated, and sunny, and at night each person goes to a bed provided with sufficient bedding to keep warm; meals are served at a table in a large kitchen or dining-room; the young children have plenty of yard room in which to play without going into the road or street. The housing of our city people will vary according to the amount of money the family

has to use and these conditions are on a scale going downward from those which the millionaires can and do provide, to the miserable hovels built and owned by these same millionaires for occupancy by poor people. The problem of the health officer is not with the millionaire residences but with the houses occupied by laborers. These houses are built in height from two stories upward and then subdivided into tenements or flats and, in many instances, these flats intended for one family shelter two or more and even one room will be the abiding place of more than one family; some rooms will have no outside windows but will open into an air shaft; other rooms will have no opening except the door; the ventilation in many apartments is nil; the rooms are dark and gloomy; the beds in many instances are piles of rags in a corner or under a table and with no bedding except an old bag or dirty cloth; the children have no playground except the street. Which, I ask you, do you prefer? Hand in hand with housing comes the disposal of waste material. In the city all waste matter enters sewers and this is the ideal method of disposal or would be if landlords were required to install proper plumbing in their houses and buildings. The plumbing is far too often inadequate and faulty, allowing the escape of sewer gas and obnoxious odors. The sanitary appliances of the country are in nearly every instance the same that have been in use for many generations and while to some city health officers these seem improper yet it would be next to impossible to make any other arrangement and in

fact no better device could be proposed for the country.

Often we read that some outbreak of typhoid fever can be traced to pollution of the city water supply by material from a vault located on or near a small creek or brook, a greater or less distance from the city, and immediately the farmer is railed at. Whose duty is it to see that the water supply of the city is unpolluted—is it the duty of the rural inhabitant or is the city water commissioner and the city health inspector paid for such work? I have seen no less than three thousand people living within a huge water basin under construction, through which flowed a stream of water already supplying a large metropolitan area and all waste from this population, together with refuse from many stables deposited within this basin. How could this waste material be prevented from entering this stream of water, and what must be the added danger when water was allowed to flood this contaminated area? If this water caused any disease, I am sure that some farmer's vault would have been labelled as the source of infection. Water supplies for congested centers of population are furnished by a more or less elaborate central collecting basin or reservoir supplied by rivers, brooks, or wells. In the country the water supply for domestic use comes from wells, one or more of which will be found on each farm. The location of these wells has for a long time been a source of annoyance to city health authorities but in my opinion the country well is not nearly as dangerous as we might be led to believe by its detractors who can

theoretically trace all kinds of disease to it. Typhoid fever is the disease most often traced to impure water but does this ailment flourish more in the country than in the city? I doubt it.

Contagious and infectious diseases are less prevalent in rural districts than in settled communities from the very fact that the population is so isolated and the means of communication deficient. Occasionally city epidemics of a contagious disease are traced through the milk supply to a farm—a fact to be regretted, and always the subject for much comment, but if epidemics of the same disease should be spread by a municipal fault there would be very little if any comment.

As to food, I fail to see where much improvement can be made in the country—milk, eggs, vegetables, poultry, are fresh; in the city, milk is from 24 to 96 hours old before it is delivered and then very often it has been treated in some manner by the milk contractor or dealer and even in some instances what passes for milk never saw a cow but was manufactured; eggs are months and even years old before the housewife purchases them; poultry is somewhat ancient; vegetables are wilted from their sojourn in the market. Under these conditions, and they are not overdrawn, rather the half is not told, which, think you, the country or the city furnishes the best food to the individual?

In this short paper I have endeavored to show a comparison between the city and the country districts of our broad land. Statements here made apply to no one section in particular but

will apply equally to all parts. Yet in face of these conditions city health officials advocate teaching the farmer the right way of living, the necessity of having suitable sleeping apartments, the value of a proper relation between work and play, in fact they think the farmer's education in regard to all health matters has been sadly neglected. Can any fair-minded person truthfully say that he prefers the North End of Boston or the Lower East Side of New York City to a farm in the country. Which individual, the inhabitant of these quarters or the farmer, is living the more healthful existence? Our wealthy people of the cities depart for the country or seashore at the first breath of summer—why this exodus if the country is so unhealthy?

Which has the preferable sleeping quarters, the poor city laborer in his 2 by 4 cramped, non-ventilated bedroom up "steep" flights of stairs in a brick block surrounded by other brick piles on three sides; the city millionaire with his tapestry hung boudoir in some city mansion possibly in a thickly settled quarter, or a farmer with his bedroom well ventilated and perfumed in summer with the scent of new mown hay?

In the city the poor people are, because of the greed of those who supply food products, far too often unable to buy the bare necessities of life and what they can provide is generally of an inferior grade; the city rich provide highly spiced sauces, salads, desserts, and foods fancy named; the farmer provides good wholesome food in abundance; who

of these is living the nearest to the standard considered the best? If there is any doubt, look at any representative of these classes and the answer is obvious.

Equalization of work and play periods for the country boy and girl is another topic for consideration. Nearly every boy and girl on a farm has certain tasks allotted to them. I personally do not believe those tasks seem irksome but on the contrary the children are ready and willing to perform their small part of the home duties, nor do I believe that those tasks are in the least bit harmful. I firmly think that the boy or girl who is required to perform some labor is thereby the better fitted to grasp life's problems and this training also teaches industry and self reliance. Not all country lads, like many of their city brethren, are industrious but are ready to avoid even the easiest task. Compare the physical, yea the mental condition of the country lad with a city boy of the same age and judge for yourself which is the better fitted. Carry this comparison to adult life, if you will, and see how many of our prominent men holding high positions in the business, professional, and political life are either farmers or sons

of farmers. The farmer's child is taught industry and thrift in early life and this instruction remains uppermost to the end.

The pastimes of the country are much different than are those of the city but are more healthful and tend to promote better morals and higher standards of thought. The country lad has not the opportunity to attend three or four dances a week where he can perform some fandango, or attend the theatre, or a card party, because such amusements are not common in his locality.

I know just as well as does any other person that many changes could be made in the manner of living in the country, with advantage to the farmer and his family, but I am equally aware that for every change in the country a score of greater alterations could be made in city life and would be of greater profit to a greater number of human beings.

It seems to me that if city health officials would discharge their whole duty to the community there would be less talk of the farmer, and greater activity looking to improvement in housing conditions, in manner of living, in sanitation, in the care and kind of food offered for sale in our urban communities.

PROPOSED ALTERATIONS IN PROCEDURE FOR STANDARD METHODS OF WATER ANALYSIS.

EDWARD BARTOW, *Chairman.*

IN ACCORDANCE with a resolution adopted by the Laboratory Section of the American Public Health Association at the Rochester meeting, September 10, 1915, proposed new standard methods for the analysis of water and sewage are herein outlined for the information and criticism of the members of the association. The form in which it is proposed to publish the procedures is given. All members of the association and others interested in the analysis of water are invited to submit criticisms of these methods to the chairman of the committee. As it is necessary to consider such criticisms before their incorporation in the printed report, they should reach the chairman at Urbana, Ill., no later than April 10, 1916. Final action on the procedures will be taken at a meeting of the committee in Urbana, Ill., during the spring session of the American Chemical Society, April 17-21.

AVAILABLE CHLORINE.

In waters that have been treated with calcium hypochlorite or liquid chlorine it is frequently advisable to ascertain the presence or absence of available chlorine. As the reagents which have been proposed for its detection are not specific for chlorine but give similar or identical reactions with oxidizing agents or reducible substances, care must be exercised in interpreting the results of such tests;

nitrites and ferric salts are of common occurrence, and chlorates also may lead to misinterpretation in waters treated with calcium hypochlorite.

Reagents.—1. Tolidin solution. One gram of *o*-tolidin, purified by being recrystallized from alcohol, is dissolved in 1 liter of 10 per cent. hydrochloric acid.

2. Copper sulfate solution. Dissolve 1.5 grams of copper sulfate and 1 cc. of concentrated sulfuric acid in distilled water and dilute the solution to 200 cc.

3. Potassium bichromate solution. Dissolve 0.025 gram of potassium bichromate and 0.1 cc. of concentrated sulfuric acid in distilled water and dilute the solution to 200 cc.

Procedure.—Mix 1 cc. of the tolidin reagent with 50 cc. of the sample in a Nessler tube and allow the solution to stand at least 5 minutes. Small amounts of free chlorine give a yellow and larger amounts a yellow-green color.

For quantitative determination, comparison of the color is made with that of standards in similar tubes prepared from the solutions of copper sulfate and potassium bichromate. The amounts of solution for various standards are indicated in Table 13.

Concentrations greater than 0.10 part per million of chlorine require use of a stronger bichromate solution, containing 0.25 gram of potassium bichromate and 1 cc. of concentrated

TABLE 13.

PREPARATION OF PERMANENT CHLORINE STANDARDS FOR LOW CHLORINE CONTENT.

Value in chlorine	Copper sulfate solution	Potassium bichromate solution
<i>Parts per million</i>	<i>cc.</i>	<i>cc.</i>
0.01	0.0	0.8
.02	.0	2.1
.03	.0	3.2
.04	.0	4.3
.05	.4	5.5
.06	.8	6.6
.07	1.2	7.5
.08	1.5	8.7
.09	1.7	9.0
.1	1.8	10.0

sulfuric acid dissolved in distilled water and diluted to 200 cc. The proper amounts of solution for stronger permanent standards are given in Table 14.

DISSOLVED OXYGEN.

Reagents.—1. Sulfuric acid. Concentrated (Sp. gr., 1.83–1.84).

2. Potassium permanganate. Dissolve 6.32 grams of the salt in water and dilute the solution to 1 liter.

3. Potassium oxalate. A 2 per cent. solution.

4. Manganous sulfate. Dissolve 480 grams of the salt in water and dilute the solution to 1 liter.

5. Alkaline potassium iodide. Dissolve 700 grams of potassium hydroxide and 150 grams of potassium iodide in water and dilute the solution to 1 liter.

6. Hydrochloric acid. Concentrated (Sp. gr. 1.18–1.19).

TABLE 14.

PREPARATION OF PERMANENT STANDARDS FOR HIGH CHLORINE CONTENT.

Value in chlorine.	Copper sulfate solution.	Stronger potassium bichromate solution.
<i>Parts per million</i>	<i>cc.</i>	<i>cc.</i>
0.10	1.8	1.0
.20	1.9	2.0
.30	1.9	3.0
.40	2.0	3.8
.50	2.0	4.5
.60	2.0	5.1
.70	2.0	5.8
.80	2.0	6.3
.90	2.0	6.7
1.0	2.0	7.2
2.0	2.0	12.0
3.0	2.0	21.0
4.0	2.0	30.0
5.0	2.0	39.0
6.0	2.0	46.0
7.0	2.0	56.0
8.0	2.0	63.0
9.0	2.0	70.0
10.0	2.0	75.0

7. Sodium thiosulfate. A N/40 solution. Dissolve 6.2 grams of chemically pure recrystallized sodium thiosulfate in water and dilute the solution to 1 liter with distilled water. Each cc. is equivalent to 0.2 mg. of oxygen or to 0.1395 cc. of oxygen at 0° C. and 760 mm. pressure. Inasmuch as this solution is not permanent it should be standardized occasionally against N/40 solution of potassium bichromate. The keeping qualities of the thiosulfate solution are improved by adding to each liter 5 cc. of chloroform and 1.5 grams of ammonium

carbonate before making up to the prescribed volume.

8. Starch solution. Mix a small amount of clean starch with cold water until it becomes a thin paste and stir this mass into 150 to 200 times its weight of boiling water. Boil for a few minutes to sterilize. It may be preserved by adding a few drops of chloroform.

Collection of sample.—Collect the sample in a narrow-necked glass-stoppered bottle of 250 to 270 cc. capacity. The following method should be followed in order to avoid entrainment or absorption of atmospheric oxygen. In collecting from a tap. Fill the bottle through a glass or rubber tube extending well into the tap and to the bottom of the bottle. To avoid air bubbles allow the bottle to overflow for several minutes, and then carefully replace the glass stopper so that no air bubble is entrained. In collecting from the surface of a pond or tank connect the sample bottle to a bottle of 1 liter capacity. Provide each bottle with a two-hole rubber stopper having a glass tube extending to the bottom and a short glass tube entering but not projecting into the bottle. Connect the short tube of the sample bottle with the long tube of the liter bottle. Immerse the sample bottle in the water and apply suction to the outlet of the liter bottle. To collect a sample at any depth. Arrange the two bottles so that the outlet tube of the liter bottle is at a higher elevation than the inlet tube of the sample bottle. Lower the two bottles, in any convenient form of cage properly weighted, to the desired depth.

Water entering during the descent will be flushed through into the liter bottle. When air bubbles cease rising to the surface raise the bottles. Finally replace the perforated stopper of the sample bottle with a glass stopper in such manner as to avoid entraining bubbles of air.

Procedure.—Remove the stopper from the bottle and add, first, 0.7 cc. of the concentrated sulfuric acid, and then 1 cc. of the potassium permanganate solution. These and all other reagents should be introduced by pipette under the surface of the liquid. Insert the stopper and mix by inverting the bottle several times. After 20 minutes have elapsed destroy the excess of permanganate by adding 1 cc. of the potassium oxalate solution, the bottle being at once restoppered and its contents mixed. If a noticeable excess of potassium permanganate is not present at the end of 20 minutes, again add 1 cc. of the potassium permanganate solution. If this is still insufficient use a stronger potassium permanganate solution. After the liquid has been decolorized by the addition of potassium oxalate add 1 cc. of the manganous sulfate solution and 3 cc. of the alkaline potassium iodide solution. Allow the precipitate to settle. Add 2 cc. of the hydrochloric acid and mix by shaking.

The procedure must be carried out to this point in the field, but after the acid has been added and the stopper replaced there is no further change, and the rest of the test may be performed within a few hours, as convenient. Transfer 200 cc. of the contents of the bottle to a flask and

titrate with N/40 sodium thiosulfate, using a few cubic centimeters of the starch solution as indicator toward the end of the titration. Do not add the starch solution until the color has become faint yellow, and titrate until the blue color disappears.

The use of potassium permanganate is made necessary by high nitrite or organic matter. The procedure outlined must be followed in all work on sewage and partly purified effluents or seriously polluted streams or sample nitrite nitrogen of which exceeds 0.1 part per million. In testing other samples the procedure may be shortened by beginning with the addition of the manganous sulfate solution and proceeding from that point as outlined.

Calculation of results.—Oxygen shall be reported in parts per million by weight. It is sometimes convenient to know the number of cubic centimeters per liter of the gas at 0° C. temperature and 760 mm. pressure and also to know the percentage which the amount of gas present is of the maximum amount capable of being dissolved by distilled water at the same temperature and pressure. If 200 cc. of the sample is taken the number of cubic centimeters of N/40 thiosulfate used is equal to parts per million of oxygen. Corrections for volume of reagents added amount to less than 3 per cent. and are not justified except in work of unusual precision. To obtain the result in cubic centimeters per liter, multiply the number of cubic centimeters of thiosulfate used by 0.698. To obtain the result in percentage of saturation divide the

number of cubic centimeters of thiosulfate used by the figure in Table 11* opposite the temperature of the water and under the proper chlorine figure. The last column of Table 11 permits interpolation for intermediate chlorine values. At elevations differing considerably from mean sea level and for accurate work, attention must be given to barometric pressure, the normal pressure in the region being preferable to the specific pressure at the time of sampling. The term "saturation" refers to a condition of equilibrium between the solution and an oxygen pressure in the atmosphere corresponding to 158.8 millimeters, or approximately one-fifth atmosphere. The true saturation or equilibrium between the solution and pure oxygen is nearly five times this value and consequently values in excess of 100 per cent. saturation frequently occur in the presence of oxygen-forming plants.

RELATIVE STABILITY OF EFFLUENTS.

Reagent.—Methylene blue solution. A 0.05 per cent. aqueous solution of methylene blue, preferably the double zinc salt or commercial variety.

Collection of sample.—Collect the sample in a bottle holding approximately 150 cc. If the dissolved oxygen is low, observe precautions similar to those used in collecting samples for dissolved oxygen (p. 162). Use rubber stoppers or a cork stopper of good grade which has been boiled in water.

Procedure.—Add 0.4 cc. of the methylene blue solution to the sample in the 150 cc. bottle. As methylene blue has a slightly antiseptic property

*Table 11 is table 12 in Edition 2 of Standard Methods, p. 62.

be careful to add exactly 0.4 cc. Add the methylene blue solution preferably below the surface of the liquid after filling the bottle with the sample. If the methylene blue is added first do not allow the liquid to overflow as coloring matter will thus be lost. Incubate the sample at 20° C. for ten days. Four days' incubation may be considered as sufficient for all practical purposes in routine plant-control work. If quick results are desired incubate the sample at 37° C. for five days using suitable stoppers to prevent the loss and reabsorption of dissolved oxygen. The bacterial flora at 37° C. is different from the flora at 20° C. The lower temperature is more nearly the average temperature of surface waters and therefore the higher temperature should be used only when quick approximate results are essential. Observe the sample at least twice a day during incubation. Give a sample in which the methylene blue becomes decolorized a relative stability corresponding to the time required for reduction (See table 12). For routine filter control ordinary room or cellar temperature will give fairly satisfactory results. For accurate studies, room temperature incubation is very undesirable, as the fluctuations in temperature which are ordinarily not noticed are responsible for appreciable deviations from the true values of relative stability. If the samples are incubated less than 10 days at 20° C. and are not decolorized, place a plus sign after the stability value in order to indicate that the stability might have been higher if more time had

been allowed. In applying this test to river waters it oftens happens that the blue coloring matter is precipitated either partly or completely through absorption by the clay which many rivers carry in suspension. True relative stabilities cannot be obtained for such waters except by determining the initial available oxygen at the start and the biochemical oxygen demand on incubation at 20° C. for 10 days. Germicides, such as calcium hypochlorite, if present in sufficient quantity vitiate the results. If a sample contains free chlorine, therefore, store it about 2 hours, or until the chlorine is gone, and then add methylene blue.

Table 12 gives the relation between the time of reduction in days at 20° C. and the relative stability number.

TABLE 12.
RELATIVE STABILITY NUMBERS.

t_{20}	S	t_{20}	S
0.5	11	8.0	84
1.0	21	9.0	87
1.5	30	10.0	90
2.0	37	11.0	92
2.5	44	12.0	94
3.0	50	13.0	95
4.0	60	14.0	96
5.0	68	16.0	97
6.0	75	18.0	98
7.0	80	20.0	99

S=Relative stability or ratio of available oxygen to oxygen required for equilibrium. Expressed in percent.

t_{20} =Time in days to decolorize methylene blue at 20° C.

The theoretical relation is,

$$S=100(1-0.794)^{t_{20}}$$

The relation between the time of reduction at 20° C. and that at 37° C. is approximately two to one. It is desirable that each observer work out his own comparative 37° C. table or factor, but results should be reported in terms of 20° C. stability numbers.

A relative stability of 75 signifies that the sample examined contains a supply of available oxygen equal to 75 per cent. of the amount of oxygen which it requires in order to become perfectly stable. The available oxygen is approximately equivalent to the dissolved oxygen plus the available oxygen of nitrates and nitrites. The nitrites in sewage are usually so low as to be negligible.

BIOCHEMICAL OXYGEN DEMAND OF SEWAGES AND EFFLUENTS.

Relative stability method.—The relative stability method may be employed to obtain a measure of the putrescible material in sewages and effluents in terms of oxygen demand.

Procedure for effluents.—Divide the total available oxygen, including the oxygen of nitrites and nitrates, by the relative stability expressed as a decimal.

Procedure for sewages.—Make one or two dilutions with fully aerated distilled water of known dissolved oxygen content. Tap water may be employed if it is free from nitrates. Vary the relative proportions of sewage and water to be employed to give a relative stability of from 50 to 75. Unless proper seals are employed bring the water as well as the sewage to the temperature at which the mixtures are to be incubated before preparing

the dilutions. During the manipulation avoid aëration. Having made the proper dilutions, determine the relative stability of each.

Calculate the oxygen demand in parts per million by the following formula:

$$\text{Oxygen demand is } \frac{O(1-p)}{R p}$$

In this formula *O* is the initial dissolved oxygen of the diluting water; *p* is the proportion of sewage; and *R* is the relative stability of the mixture. Ordinarily the available oxygen in crude sewages, septic tank effluents, settling tank effluents, and trade wastes can be neglected.

Sodium nitrate method.—For the determination of the biochemical oxygen demand the sodium nitrate method may be used. The method is based on the biochemical consumption of oxygen from sodium nitrate by a sewage or polluted water during an incubation period of ten days at 20° C. A reasonable excess of sodium nitrate does not give a higher oxygen demand, as do higher dilutions with aerated water. The oxygen absorbed from the air in applying the method to sewages is negligible.

Reagent.—Sodium nitrate solution. Dissolve 26.56 grams of pure sodium nitrate in 1 liter of distilled water. One cc. of this solution in 250 cc. of sewage represents 50 parts per million of available oxygen. The strength of the sodium nitrate solution may be varied to suit conditions.

Procedure for sewages.—Ordinarily disregard the initial available oxygen as it is very small compared with the

total biochemical oxygen demand. Add measured amounts of the sodium nitrate solution to the sewage in bottles holding approximately 250 cc. which have been completely filled and stoppered. Incubate for 10 days at 20° C. A seal is not required during incubation. The appearance of a black sediment and the development of a putrid odor during incubation indicates that too little sodium nitrate has been added. Methylene blue solution in proper proportion may be added at the start to serve as an indicator during the incubation. Domestic sewage usually varies in its oxygen demand from 100 to 300 parts per million, approximately 30 per cent. of which is used up at 20° C. in the first 24 hours. At the end of the incubation period determine the residual nitrite and nitrate. Determine the nitrate by the aluminium reduction method, followed by direct Nesslerization. To convert the nitrogen into oxygen equivalents, multiply the nitrite nitrogen by 1.7 and the nitrate nitrogen by 2.9. The difference between the available oxygen added as sodium nitrate and that found as nitrite and nitrate at the end of the incubation period is the biochemical oxygen demand.

Procedure for tradewastes.—Employ the same procedure using larger quantities of the sodium nitrate solution. Make the reaction alkaline to methyl orange and acid to phenolphthalein. Adjust an acid reaction with sodium bicarbonate, and a caustic alkaline reaction with weak hydrochloric acid. If the liquid is devoid of sewage bacteria seed it with sewage after adjusting the reaction.

Procedure for polluted river waters.—Determine the initial available oxygen. Unless the river water is badly polluted add 10 parts per million of sodium nitrate oxygen. Collect carefully to avoid aëration, three samples in 250 cc. bottles. To one sample add a definite quantity of sodium nitrate solution and incubate. Incubate the other two samples for the determination of the residual free oxygen, nitrite and nitrate. If there is free oxygen left, the bottle containing the sodium nitrate solution may be discarded. If there is no free oxygen determine residual nitrite and nitrate as directed under the procedure for sewage (p. 165), and calculate the oxygen demand.

THE ANALYSIS OF SEWAGE SLUDGE AND MUD DEPOSITS.

Collection of sample.—Collect a representative sample of the material. In general more than one single sample should be taken from a spot, and a large number of small samples should be collected rather than a few large samples. If the surface layer is darker and a lower layer consists of pure clay, sample only the surface layer for analysis. Samples may be analyzed either separately or as composites of careful mixtures. After a few minutes' settling, roughly drain or siphon the excess water. Allow sewage sludge to stand for one hour before draining it free from excess water, unless it is essential to determine the moisture content of the sample originally collected. If sludge cannot be analyzed within twenty-four hours it is best not to employ air-tight bottles and to add

small quantities of chloroform to retard decomposition. At the time of collection carefully examine mud from the bottom of surface water for evidence of sewage pollution and macroscopic and microscopic animal and plant organisms. Record the predominant species. Note the physical appearance of the material, particularly its color, odor, and consistency. Express all analytical results in percentage on a dry basis.

Specific Gravity.

Weigh to the nearest tenth of a gram a wide-mouthed flask of 100 to 300 cc. capacity, according to the quantity of material available. Then completely fill the flask with distilled water to the brim, and weigh it again. Empty and fill the flask completely with fresh sewage sludge or mud. If the material is of such consistency that it flows readily, fill the flask to the brim and weigh. The specific gravity is equal to the weight of the sludge or mud divided by the weight of an equal volume of distilled water.

If the material does not flow readily, fill the weighed flask as completely as possible without exerting pressure during the procedure. Weigh and then fill the flask to the brim with distilled water. Let it stand for a few minutes, until trapped air has escaped, then add more water if necessary and weigh. The specific gravity is equal to the weight of the material divided by the weight of the distilled water less the weight of the water added. Record the specific gravity only to the second decimal place.

Moisture.

Heat approximately 25 grams of sludge or mud in a weighed nickel dish on the water bath until it is fairly dry. Dry the residue in an oven at 100° C., cool, and weigh. Repeat to approximate constant weight. The loss in weight is moisture.

Volatile and Fixed Matter.

Ignite, in a hood, the residue from the determination of moisture until all the carbon has disappeared. Cool the residue in a desiccator and weigh it. The residue is the fixed matter. The volatile matter is the difference in weight between the original dried sludge and the ignited sludge.

Total Organic Nitrogen.

Preparation of sample.—For the determination of organic nitrogen and fat dry approximately 50 to 75 grams of the sludge or mud in a porcelain dish first on the water bath and finally in the hot-water oven until all the moisture has disappeared. Grind the dry material to a fine powder and keep it in a glass-stoppered bottle.

Reagents.—1. Sulfuric acid. Concentrated, nitrogen free.

2. Copper sulfate solution. Ten per cent.

3. Potassium permanganate. Crystals.

Procedure.—Weigh accurately 0.5 gram of dried sludge or 5.0 grams of dried mud and put it in a 500 cc. Kjeldahl flask. Digest it with 20 cc. of sulfuric acid, or more if necessary, and 1 cc. of copper sulfate solution to assist the oxidation. Boil for several

hours until the liquid becomes colorless or slightly yellow. Oxidize the residue with 0.5 gram of potassium permanganate, and follow the "Procedure for Sewage" (p. 165).

The following method is convenient for routine work at sewage disposal plants. Digest 0.5 gram of dried sludge or 5.0 grams of dried mud with 20 cc. of strong sulfuric acid and 1 cc. of the copper sulfate solution in a 300 cc. Kjeldahl flask. After digestion for several hours, cool, transfer to a glass-stoppered 100 cc. flask, dilute with distilled water to 100 cc., and mix well. Transfer 50 cc. with a pipette into another 100 cc. volumetric flask, and make this portion alkaline with 50 per cent. sodium hydroxide, testing a drop of the liquid on a porcelain plate with phenolphthalein to insure neutralization. The formation of a floc usually indicates that the neutralization is complete. Pour the solution into a small glass-stoppered bottle and permit it to stand until the next day. Nesslerize an aliquot portion of the clear supernatant liquid, and calculate the percentage of nitrogen in the material.

Fats.

Fats are usually determined only on sewage sludge, but some mud deposits contain small quantities due to the presence of trade wastes.

Procedure.—Weigh, according to the quality of the sewage or mud, 0.5 to 25 grams of dry material. Add water to the weighed portion in a porcelain dish and acidify the mixture with N/50 sulfuric acid in the presence of litmus tincture or azolitmin so-

lution indicator. Avoid adding too much acid as an excess gives too high results on account of fatty acid residues. Evaporate the acidified mixture to dryness on the water bath, and heat it in the hot air oven at 100° C. for two to three hours. Extract the dry residue with boiling ether, rubbing the sides and bottom of the dish to insure complete solution of the fat. Three extractions with ether are usually sufficient. Filter the ether solution through a 5 cm. filter paper into a small flask. Evaporate the ether slowly, dry the fatty extract for half an hour at 100° C., cool in a desiccator and weigh. If it is desirable, particularly with certain trade wastes, to determine the quantity of soap fat, determine the fats with and without the addition of acid. The difference between the amounts found by the two determinations is the amount of soap fat present.

Ferrous Sulfide.

The liberation of hydrogen sulfide on adding dilute hydrochloric acid to a sludge indicates the presence of ferrous sulfide. As ferrous sulfide quickly oxidizes on exposure to air, a quantitative determination of this constituent must be made immediately after collection of the sample.

Procedure.—Heat a definite portion of the sludge with hydrochloride acid in a flask. Pass the liberated gas through Bromin water or hydrogen peroxide. Determine gravimetrically the sulfate in the oxidizing solution, and calculate the equivalent of ferrous sulfide by multiplying the weight of barium sulfate by 0.376.

Biochemical Oxygen Demand.

The quantity of river mud most suitable for the determination of the biochemical oxygen demand ranges within certain limits, largely according to the amount of deoxygenating matter present. For examinations of river mud prepare a 1 per cent. stock solution in distilled water or tap water saturated with oxygen and free from nitrate; use in the test a dilution of this stock solution equivalent to a concentration of 1 to 10 grams per liter of mud. For examinations of fresh sewage sludge prepare a 1 per cent. stock solution in a similar manner, but use in the test a dilution equivalent to only 0.1 to 1.0 gram per liter of wet material. For examinations of dried sludges, which have undergone more or less mineralization, higher concentrations may be required.

Procedure.—Place a measured portion of the sample, or the proper amount of the 1 per cent. stock solution of the sample, in a 300 cc. narrow-mouth, glass-stoppered bottle, and dilute it to the desired dilution with water saturated with oxygen. Deter-

mine the oxygen content at 20° C. of the waters that are used for dilution. This determination must be made before the mud or sludge is added, because iron sulphide in the mud or sludge rapidly consumes part of the dissolved oxygen. Incubate at 20° C. for five days.

Shortly before the determination of the oxygen remaining in solution at the end of five days rotate the bottle once or twice to mix its contents and allow sedimentation for about 30 minutes. Siphon the greater part of the liquid through a narrow bore siphon into a 150 cc. bottle, which has been filled with carbon dioxide. Reject the first 25 cc. of the siphoned liquid and allow a little to overflow at the end of siphoning. Determine the oxygen content of the solution in the bottle in the usual way (p. 162). Report the oxygen demand in grams of oxygen per 100 grams of dried mud or sludge.

ANALYSIS OF CHEMICALS.

The following sections describe the accepted methods for the analysis of the chemicals commonly used in the treatment of water.

Reagents.

1. Distilled water. In practically all the tests of chemicals it is necessary to use exclusively distilled water that has been freshly boiled to free it from carbon dioxide and oxygen.

2. Concentrated hydrochloric acid. Sp. gr. 1.20.

3. Standard hydrochloric acid. A N/2 solution.

4. Ammonium hydroxide. Redistilled; Sp. gr. 0.90.

5. Dilute sulfuric acid. Dilute 1 part of concentrated sulfuric acid with 3 parts of freshly boiled distilled water.

6. Methyl orange indicator. See page 163.

7. Phenolphthalein indicator. See page 166.

8. Bromine. Sp. gr. 3.14.

9. Standard stannous chloride. A N/20 solution. This should be frequently standardized by titration against a standard iron solution. One cc. of N/20 stannous chloride is equal to 0.0028 gram of iron (Fe) estimated in the ferrous state.

10. Sodium hydroxide, N/1. Free from carbonate. This should be frequently standardized by titration against a standard acid solution in presence of phenolphthalein indicator. One cc.

of N/1 sodium hydroxide is equal to 0.049 gram of sulfuric acid (H_2SO_4), or to 0.03645 gram of hydrochloric acid (HCl).

11. Sodium hydroxide, N/20. Free from carbonate.

12. Standard potassium permanganate. A N/10 solution. One cc. of N/10 potassium permanganate is equal to 0.0056 gram of iron (Fe) estimated in the ferrous state.

13. Alcohol. Ethyl alcohol, 95 per cent.

14. Sugar. Solid granulated cane sugar.

Sulfate of Aluminium.

Determine and report insoluble matter, aluminium oxide (Al_2O_3), ferric oxide (Fe_2O_3), ferrous oxide (FeO), basicity ratio, and, if present, free acid as H_2SO_4 . If the material is what is known as "granular" sulfate mix it well before sampling. If it is in lump form crush it to $\frac{1}{8}$ to $\frac{1}{4}$ inch size, mix, and sample it. It is unnecessary to grind the sample to a fine powder, but it is preferable to have the particles fairly uniform in size.

Insoluble Matter.

Treat 10 grams of the sample with 100 cc. of distilled water and digest one hour at boiling temperature. Filter through a weighed Gooch crucible and wash the insoluble matter with hot water freshly boiled to free it from carbon dioxide. Dry the crucible to constant weight at 100°C ., cool, and weigh. Report the percentage of insoluble matter.

Oxides of Iron and Aluminium.

Dilute the filtrate from the determination of insoluble matter to 500 cc. with water free from carbon dioxide and thoroughly mix the solution. Transfer 50 cc. of the solution to a 250 cc. beaker, add about 150 cc. of water and 5 cc. of concentrated hydrochloric acid, and heat to boiling. Add ammonium hydroxide in slight excess; when the solution has been almost neutralized it is convenient to add a drop of methyl orange indicator and then to add about 0.5 cc. of ammonium hydroxide after the solution is neutral to the indicator. Digest at about 100°C . for a few minutes and filter. Some analysts prefer to wash this gelatinous precipitate with hot water by decantation, and some to wash it evenly distributed over the surface of a paper filter; either method may be used. It is difficult to free it

completely from impurities and it is not necessary to do so unless unusual quantities of calcium, magnesium, sodium, or potassium are present. While washing the precipitate on the filter do not allow it to become dry, as it then packs and cannot be washed clean. After most of the water has drained, drying the filter may be hastened by placing it on a sheet of blotting paper. If much iron is present completely dry the precipitate, remove it from the paper, and ignite the paper separately. Finally, blast the precipitate, with free access of air to the crucible, for five or ten minutes, cool, and weigh as oxides of iron and aluminium ($\text{Fe}_2\text{O}_3 + \text{Al}_2\text{O}_3$).

Subtract the content of total iron, expressed as ferric oxide (Fe_2O_3), from the weight of the combined oxides and report the difference as aluminium oxide (Al_2O_3), in percentage.

Total Iron.

As filter alum usually contains 0.2 to 0.3 per cent. of iron use a 10 gram sample for the determination of total iron. Treat the sample with 50 cc. of freshly boiled distilled water and add 5 cc. of concentrated hydrochloric acid and 1 cc. of bromine. Evaporate the solution to dryness, dissolve the residue in water, and wash it into a flask with sufficient water to make the volume about 50 cc. Add 50 cc. of concentrated hydrochloric acid, boil to expel oxygen, and titrate, as hot as possible, with N/20 stannous chloride.

If a 10 gram sample is used the percentage of iron (Fe) is equal to the number of cubic centimeters of stannous chloride used multiplied by 0.028. The percentage of iron expressed as ferric oxide is equal to the number of cubic centimeters of stannous chloride used multiplied by 0.040.

Ferric Iron.

As filter alum usually contains 0.02 to 0.04 per cent. of ferric iron use a 20 gram sample. Boil 50 cc. of distilled water to expel oxygen, add 50 cc. of concentrated hydrochloric acid, and add the sample while the solution is boiling. Keep it boiling till the sample is dissolved. The flask should be kept filled with carbon dioxide during this process by dropping in occasionally small amounts of sodium carbonate. When the solution of the sample is complete titrate it hot immediately with N/20 stannous chloride.

If a 20 gram sample is used the percentage of ferric oxide (Fe_2O_3) is equal to the number of

cubic centimeters of stannous chloride used multiplied by 0.020.

Ferrous Iron.

The content of ferrous iron is the difference between total and ferric iron. The percentage of ferrous oxide (FeO), is, therefore, equal to 0.90 times the difference between the percentage of total iron expressed as ferric oxide and the percentage of ferric iron expressed as ferric oxide. Report the percentage of ferrous oxide (FeO).

Basicity Ratio.

Transfer 50 cc. of the filtrate from the determination of insoluble matter to a 200 cc. casserole and dilute it to 100 cc. Boil the solution and titrate it at boiling temperature with N/1 sodium hydroxide in presence of phenolphthalein indicator. The percentage of acidity in equivalent of sulphuric acid (H_2SO_4) is equal to the number of cubic centimeters of sodium hydroxide used multiplied by 4.9. In this titration iron and aluminium are precipitated as hydroxides and any free acid is neutralized.

Calculate the percentage of sulfuric acid equivalent of the determined percentages of aluminium oxide, ferric oxide, and ferrous oxide by the following formula:

$$\text{Percentage of acid equivalent} = 2.8792 \text{ Al}_2\text{O}_3 + 1.83 \text{ Fe}_2\text{O}_3 + 1.36 \text{ FeO}.$$

If this percentage of acid equivalent is less than that found by titration report the difference as percentage of free acid. If the percentage of acid equivalent is greater than that found by titration the difference divided by 2.8792 is percentage equivalent of the excess of aluminium oxide present. Divide this excess by the percentage of total aluminium oxide and report the quotient as the basicity ratio.

Lime.

Mix well the sample, which should contain no lumps. If foreign matter is present grind the sample to pass a 100-mesh sieve.

Place 20 grams of granulated cane sugar and 1 gram of the sample in a 250 cc. glass-stoppered bottle, tightly stopper, and mix the mass by rolling. Do not shake hard as much of the lime could thus be lost as dust. Then add 187.4 cc. of distilled water freshly boiled to expel carbon dioxide. This makes 200 cc. of sugar solution.

The lime is mixed dry with the sugar and the water added later to keep the lime from lumping. After shaking the sugar solution one hour titrate 50 cc. of it with N/2 hydrochloric acid in presence of methyl orange indicator. The acid used is equivalent to the carbonate and hydroxide in 0.25 gram of the sample.

Filter the remainder of the sugar solution, discarding the first 25 cc. of filtrate. Titrate 50 cc. of the filtrate with N/2 hydrochloric acid in presence of methyl orange indicator. The acid used is equivalent to the hydroxide in 0.25 gram of the sample.

If a 1 gram sample is used the percentage of calcium oxide (CaO) is equal to 5.6 times the number of cubic centimeters of hydrochloric acid used in the second titration; and the percentage of calcium carbonate (CaCO_3) equivalent to the carbonate present is equal to 10 times the difference in cubic centimeters between the results of the two titrations.

Iron Sulfate—Insoluble Matter.

Treat 10 grams of the sample with 100 cc. of freshly boiled distilled water cooled to 30° C. or less. When solution is complete filter through a weighed Gooch crucible, wash, dry, cool, and weigh. Report the weight of the residue, in percentage, as insoluble matter.

Iron as Ferrous Sulfate.

Dissolve 1 gram of the sample and dilute to 200 cc. with freshly boiled distilled water cooled to 30° C. or less. Add 5 cc. of dilute sulfuric acid (1 to 3) to a 50 cc. portion of the solution and titrate with N/10 potassium permanganate. The percentage of ferrous sulfate ($\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$) is equal to 11.12 times the number of cubic centimeters of potassium permanganate used.

Acidity.

Shake 12.25 grams of the sample in a 50 cc. bottle with 75 cc. of 95 per cent. alcohol for ten minutes. Run a blank. Filter rapidly both sample and blank and wash rapidly with alcohol sufficient to make 100 cc. of filtrate. Titrate with N/20 sodium hydroxide in presence of phenolphthalein and subtract the result of titrating the blank from that of titrating the solution of the sample. The percentage of acidity, expressed as sulfuric acid (H_2SO_4), is equal to 0.02

times the number of cubic centimeters of sodium hydroxide used.

Soda Ash—Insoluble Matter.

Treat 5.305 grams of the sample with 200 cc. of freshly boiled and cooled distilled water. When solution is complete filter through an asbestos mat in a weighed Gooch crucible, dry, cool, and weigh. Report the weight of the residue, in percentage, as insoluble matter.

Available Alkali.

Dilute the filtrate from the determination of insoluble matter to 1,000 cc. and thoroughly mix. Titrate 25 cc. of this dilution with N/10 hydrochloric acid in presence of methyl orange indicator. The percentage of available alkali, expressed as sodium carbonate (Na_2CO_3), is equal to 4 times the number of cubic centimeters of hydrochloric acid used.



TUBERCULOSIS PREVENTORIUM FOR CHILDREN.

At the Annual Meeting of the Tuberculosis Preventorium for Children held at the Academy of Medicine, Dr. Hermann M. Biggs, president of the institution, announced that new-born babies of tuberculous mothers were now being saved from tuberculosis by taking infants away from their mothers and giving them the fresh-air cure in the New Jersey pine belt. At the present time 12 infants are being cared for, and if funds can be secured it is hoped to erect a special pavilion to extend this important work.

Doctor Biggs also reported that the institution cared for 678 children 4 to 14 years of age last year, all of the children gaining in health and strength. The average gain in weight was 7 pounds and one little girl from Brooklyn gained 22 pounds. The Preventorium provided a total of 67,763 patient days of which over 7,000 were wholly free at the expense of the institution, the rest being partly supported by the city.

According to Doctor Jacobi, this plan of combating tuberculosis is entirely new. "In

principle," said Doctor Jacobi, "it is like the so-called Bang method which has proven so successful in eradicating tuberculosis from the dairy cattle in Denmark. I believe that this work with babies will prove an important factor in the anti-tuberculosis campaign."

The following officers were reelected:

President, Dr. Hermann M. Biggs;
First vice-president, Mr. Alfred F. Hess;
Second vice-president, Mrs. Henry Phipps;
Third vice-president, Isaac N. Seligman;
Secretary, Morgan M. Mann;
Treasurer, Alex. S. Webb.

The society maintains an all-year-round fresh air institution at Farmingdale, N. J. (6 miles from Lakewood). The work is entirely free, and children from infancy to 14 years of age are accepted from tenement homes of New York City where some member of the family is afflicted with tuberculosis. They are kept for a period averaging four months.

Book Reviews.

How to Live. By Irving Fisher and Eugene Lyman Fisk. New York: Funk and Wagnalls, 1915. Pp. 345. Price, \$1.00.

This is a manual of Personal Hygiene authorized by and prepared in collaboration with a large and distinguished board of the Life Extension Institute. The Introduction is by ex-president Taft. About half the book is devoted to a clear and wisely proportioned exposition of the principles of hygienic living. Nearly as great a space is devoted to the "Supplementary Notes." Here we have a fresh and interesting treatment of such subjects as Body-weight, Posture, Alcohol, Tobacco, Colds, and Eugenics.

The exposition is simple and yet scientific; it is as specific as possible and does not end in generalities. The use made of vital statistics will compel thought and the plea for periodic physical examinations is strongly enforced. The bibliography of Nutrition, Alcohol, and Tobacco is of exceptional range and value. With somewhat singular taste the book is embellished with portraits of its numerous sponsors.

Percy G. Stiles.

Bacteriology for Nurses. By Harry W. Carey, M. D. Philadelphia: F. A. Davis Co., 1915. Pp. 133, 17 illustrations. Price, \$1.00.

An Introduction to Bacteriology for Nurses is a book admirably adapted for the nurse who wishes to familiarize herself with modern views of infection and immunity.

The author states in his preface that it is difficult for anyone instructing nurses to decide just how much of the subject to attempt to teach. He has made a wise selection in this book, the outcome of a course of lectures given for several years to nurses of the Samaritan Hospital Training School, in Troy, New York. He has limited his description of bacteria and their functions to an outline, and details of the theories of immunity, so confusing to the average nurse, are not given. The destruction of bacteria is given considerable space and bacteria

of the common diseases are discussed in detail. A valuable chapter gives the technique of preparation and the collection of material for bacteriological examination.

In his attempts to explain the terms infectious and contagious, the author is somewhat misleading when he states that diseases like pneumonia, plague and tuberculosis cannot be transmitted through the air or by coming into the presence of the sick. He apparently minimizes the danger of droplet infection.

The book might be used as a text-book for a very brief course in bacteriology, as it contains the salient points of the subject for the nurse to review from time to time.

Edith A. Beckler.

Vicious Circles in Sociology and their Treatment. By Jamieson B. Hurry, M. A., M. D. Blakisten's Son & Company, Publishers, Philadelphia, Pa., 1915. 31 pages, 2 plates. Price, 80 cents.

In this little book, Doctor Hurry points out the analogy between vicious circles in disease and vicious circles in sociology. In so brief a space, the author can hardly do more than list and classify the many vicious circles of poverty, disease, crime, inebriety, etc. This he does, however, in a graphic and stimulating way. His book is as full of texts for the social preacher and the social worker as it is of quotations from most of the writers on sociology.

His first plate and first three chapters deal with the various circles, and their interrelations.

"The chief problem is poverty, the factor which complicates so many social disorders."

Two of the circles of poverty are:

"1. Poverty—malnutrition—diminished earning power—poverty.

"2. Poverty—acceptance of low wages—charitable aid—perpetuation of low wages—poverty."

The vicious circle of disease is: disease—diminished earning power—loss of medical aid and proper food and care—greater susceptibility—disease. Doctor Hurry considers bronchitis,

rheumatism, and cardiac affections the most pauperizing diseases, after tuberculosis.

The author finds cause for hope rather than discouragement in the existence of these circles, inasmuch as a circle may be broken at any point, at more than one point at a time by coöperation, or at its weakest point. "The first task of the sociologist, therefore, is to extricate from the symptom-complex those dominant factors that constitute the Circle; to discover the weakest

link in the unending chain, and to effect a breach at the point of least resistance."

His second plate deals with the breaking of this Circle, and if his concrete suggestions for cure are somewhat too simple (as for example—"Poverty—impaired health—low wages—holiday," and "Inebriety—dyspepsia—misery—abstinence pledge") his general thesis is irrefutable, and is stated in a useful way.

D. B. Armstrong, M. D.



*Sneezes Spread Diseases
Coughs Fill Coffins
Use a Handkerchief*

Two of the "Watch Your Sneeze" poster stamp designs which the Bureau of Public Health and Hygiene of the New York Association for Improving the Condition of the Poor is supplying at cost to health officers, civic organizations, poster stamp leagues, public school, etc., in its campaign against grip and other respiratory diseases.

The design showing the two children received the first prize of ten dollars in a health poster drawing contest, conducted by the Association for Improving the Condition of the Poor in New York elementary schools.

The gummed stamps are printed in three colors and may be obtained for \$1.25 a thousand by writing to the Association for Improving the Condition of the Poor, 105 East 22d St. Large posters may also be had at cost.

Health Department Reports and Notes.

REPORTS.

Edmonton, Alberta.

This report presented by Dr. T. H. Whitelaw, Medical Officer of Health, for 1914, is a record of effective work well and concisely interpreted. The occurrence of 16 cases of smallpox (11 being city cases), all in persons who had never been vaccinated, furnishes the health officer a text for a plea in support of compulsory school vaccination. In two families specially mentioned the school children, having been vaccinated, escaped, though freely exposed. "All unvaccinated persons in both families contracted smallpox, all vaccinated ones escaped." The health officer advises that a smallpox building might properly be placed with a proposed new isolation hospital, but fears that popular prejudice would militate against this.

One hundred and fifty-three dollars was expended for diphtheria antitoxin, for distribution free or at cost. It is recommended that the Provincial government arrange to supply antitoxin free to rich and poor alike.

Thirteen of the 50 city cases of typhoid fever were traceable to direct contact infection from a previous case as the probable source. Forty-six cases of erysipelas were treated at the isolation hospital, which was considered safer for

that purpose than the general hospitals. Whooping cough proved to be a very serious matter, 403 cases with 21 deaths, which exceeded the total number due to scarlet fever, diphtheria, typhoid fever, and measles combined. Seventeen of these were in infants under one year of age.

The population of the city is stated as 70,000, but the mode of estimation is not mentioned.

Through a new by-law no meat can be legally sold in the city which does not bear the certified stamp of either a Dominion or city food inspector. Most of the city milk supply, it is stated, is now pasteurized. A special problem is created by the large number of individuals in the city who keep one or two cows and sell milk to their neighbors. It "seems scarcely fair" to the regular dealer, says the Health Officer, to exempt such persons from the equal operation of the milk regulations.

The health supervision of Edmonton was apparently conducted with efficiency and economy on a per capita total expenditure of approximately 31 cents, though this represents a considerable decrease under the previous year.

Columbia, South Carolina.

The report of this city of some 30,000 population, for 1915, consists largely of an account of the work accomplished under Dr. Skottowe B. Fishburne, who became Health Officer in June, and his recommendations for further improvement. Doctor Fishburne's first important official act was to secure a general sanitary survey of the city, which was performed with the assistance of Dr. J. C. Perry of the U. S. Public Health Service. This was followed later by a survey of the milk supply by an official detailed from the U. S. Department of Agriculture.

The sanitary survey is set forth in some detail, notably in a general table summarizing a house-to-house sanitary register or census. While certain items of such a detailed inventory may be of little or no value, *e. g.*, data of communicable disease which seem to assume "house infection" as of moment—others, such as the numbers and locations of privy-vaults, wells, and fly-breeding

stables, have a real and important bearing on specific sources of disease which are well appreciated in this report.

The Health Officer makes a strong plea for the fly-proofing of surface closets, citing the reductions in typhoid fever which have resulted from this measure in Jacksonville, Fla., and Wilmington, N. C., notes the planned extension of sewers, and projects the gradual elimination of all unnecessary surface closets. The difficulty in making sewer connections being financial inability on the part of the property-owners, the recommendation is made that "the Constitution of the State be so amended as to allow municipal governments to pay for sewerage connections, and give the property owner a term of years to reimburse the city, the city taking a lien on the property as security," as is now done with street improvements. A new sanitary service for night-soil is under way, providing for tank wagons and

disposal by means of a hopper into the sanitary sewer.

The tables are clear and indicative, and a record of 129 cases taken to court and \$146 in fines imposed indicates more than persuasion in enforcing sanitary ordinances. No financial statement is given. A very serious deficiency is the absence of vital statistics, laid to the fact that the records are not under the control of the health department. This lack is all the more

conspicuous in that such statistics are the logical complement of the thorough sanitary survey which has been made, and, indeed, if available, should even take precedence of the latter, in order to give indication of such important considerations as infant mortality and tuberculosis. This, however, does not detract from appreciation of the lines of attack which have already been admirably opened up.

Baltimore, Maryland.

The report of this city, for 1914, opens with a discussion by the Health Commissioner, Dr. Nathan R. Gorter, of the lessened death-rate, which has been more marked in the white population and which he emphasizes as of sanitary significance through a demonstration of the decreases in child life, *e. g.*, in scarlet fever, diphtheria, and infant mortality. With the pasteurization of all milk, which is proposed, it is expected that the last-named mortality will be still further reduced. The disinfection of the public water-supply since 1911 has resulted in a reduction of typhoid fever, which will be still further reduced by water filtration and the extension of sanitary sewerage.

As an important aid to the efficiency of medical inspection of school-children, it is recommended that the city establish clinics, either in school buildings or at convenient points, to which children could be taken to have their teeth, throats, noses, and eyes more carefully examined than is possible in routine school examination and where proper treatment could be given.

An especially important start has been made

in relieving the health department of a great deal of the routine of nuisance inspection at the same time securing greater efficiency in this work, by assigning definite duties in this line to police patrolmen. An order to such effect was issued by the police commissioners, and it is believed that there will be a successful development of the measure. The police, it is stated, have always been of assistance to the Health Department, but the individual officers were not made responsible for the cleanliness of their posts, as is now the case. Sanitary inspection in general, it is recommended, should be placed under a Bureau of Plumbing and Sanitation, so as to free the medical "health wardens" for more appropriate and important duties.

A conspicuous section of the report is that of the Bacteriologist, Dr. Wm. Royal Stokes, in which are discussed *in extenso* the city water-supply, typhoid fever, milk examinations, examinations of shellfish, diagnostic bacteriology, diphtheria control, etc. The report as a whole might well be preceded by a table of contents and list of the staff, with the addition also of a financial statement.

Palo Alto, California.

The report of this city of 5,200 population is a graphic proof of the fact that a small community can accomplish as high-grade health work and produce as creditable and interesting a report as those of larger size. Under the efficient execution of Mr. Harold F. Gray, a well-balanced control has been exerted since the inauguration of a new policy, in 1910, which provided for a full-time health officer and funds for office and laboratory equipment and maintenance. Since that time approximately 50 cents per capita per annum has been expended for purely health purposes. The present report, for 1914, is bound up with the municipal reports for the fiscal year 1914-15, hence its delayed appear-

ance. A statistical review of the results of the new régime shows a steady reduction of the death-rate, which now, with inclusion of deaths of residents occurring in an out-of-town hospital, stands at the very low figure of 6.5. The decrease has been most marked in those causes of death which are amenable to sanitary control, and the indication is that the expectancy of life at birth has been increased by from ten to fifteen years. While certain sanitary evils which are rife in larger, more urban places do not exist in Palo Alto, it is evident that the health control there is of the first order and that this little city is one of the brightest spots on the health map of the country.

District of Columbia.

The report of Health Officer Dr. Wm. C. Woodward shows that the death-rate of the District, *i. e.*, city of Washington, for 1914 had declined to 16.59, the lowest ever recorded in the District. This was true also of the separate rates for white and for colored population, which were respectively 13.64 and 24.31. A considerable number of dwellings of the poorer sort, especially of the colored people, are situated in alleys and interior courts, and in the present report the deaths occurring in such are tabulated separately in some detail.

In his discussion of milk supplies, Doctor Woodward touches an important condition of pasteurization requirements when he says that "in the absence of regulations defining pasteurization, specifying the conditions under which it shall be performed, and providing particularly for its supervision and control by the health officer, much of the effort devoted by milk dealers to attempts at pasteurization is unsuccessful, their efforts and money are wasted, and the public is deceived into believing that milk labeled pasteurized has as a matter of fact been through a proper pasteurizing process, whereas such is not the case." Milk is graded in Washington under the classes of "ordinary

raw milk," "special raw milk," and "pasteurized milk."

Because of the prevalence of rabies, muzzling of all dogs was required, but it is remarked that an increase in the pound force of the health department is requisite to take up unmuzzled dogs, while, on account of the impossibility of distinguishing tags and muzzles in the dark, no dogs whatever should be allowed to run at large at night.

Medical and dental inspections of schools were made much more efficient through the employment of school nurses. The work of the dental inspectors is summarized in the statement that 9,784 pupils were examined, teeth that needed filling being 25,940 and those that should be extracted 10,332, out of a total number examined of approximately 200,000; figures which sufficiently emphasize the importance of this branch of work.

The tables are very full and constitute the bulk of the report. Subjects on which one would expect to find more discussion are infant mortality and tuberculosis. The per capita per annum expenditure for health protective work in 1914-15 was approximately 35 cents.

NOTES.

Health Activities.—During the year ending June 30, 1915, Massachusetts, New Jersey and West Virginia have reorganized their health departments. The Bureau of Health of the Philippine Islands has been superseded by the Philippine Health Service. The model law for morbidity reports has been adopted in part by Ohio, Maine, Michigan, Delaware, Louisiana, Montana, Porto Rico, Vermont, Massachusetts and New York. Michigan has appropriated \$100,000 for the purpose of making a tuberculosis survey of the state. Minnesota and Indiana have enacted advanced antituberculosis legislation. Louisiana, Mississippi and Texas have passed measures looking to the control of the bubonic plague. Maine legislates on milk, while many of the states have adopted laws or regulations looking to the control of communicable diseases in general. Medical inspection of school children has received legislative attention in Hawaii, Vermont, North Dakota, Porto

Rico, Mississippi, New York, Kansas, and the Philippine Islands. Indiana authorizes the establishment of open air schools.—*Bulletin of State of Wisconsin.*

✦

Diphtheria Should be Controlled.—In Governor Whitman's address of welcome to the American Public Health Association at Rochester, he pointed out that diphtheria remains by far the most important of this group of the acute contagious diseases; and if, as I am assured, the 2,000 annual deaths from this disease in New York State are due largely to delay or neglect in applying a simple and efficient remedy in the form of diphtheria antitoxin—there is surely a grave responsibility resting upon the practising physician to remedy this deplorable condition of affairs.

There is not the slightest doubt about the facts. The use of antitoxin has reduced the diphtheria death-rate in New York State from

99 per 100,000 in 1894 to 20 per 100,000 in 1914. In pre-antitoxin days one person in every three who caught diphtheria died of it. Today, of cases which receive antitoxin after the fourth day of the disease, about one in twelve is fatal against one in fifty, in cases treated with antitoxin on the first or second day.

The antitoxin service of the State Department of Health has been completely reorganized during the past two years. The present product is of the highest purity. Every health officer keeps a stock of fresh antitoxin and physicians can at once obtain an ample supply for their needs.

The State Sanitary Code provides that "in every case of illness which there is reason to suspect is diphtheria, it shall be the duty of the attending physician or, if the local health authorities so require, of the health officer promptly to take material for cultures from the throat of the suspected person and submit the same for examination to a state, county, or municipal bacteriological laboratory, or to a laboratory approved by the State Commissioner of Health."

The use of city and county and state facilities for cultural diagnosis is the first essential step toward the control of this disease; and the occurrence of nasal diphtheria infections makes it desirable that cultures should be taken from cases of chronic nasal discharge, as well as from all suspicious cases of sore throat.

In many cases, however, the physician need not and should not wait for the laboratory test before taking steps to protect his patient. Every case in which the clinical symptoms suggest diphtheria should receive an immediate injection of 3,000-5,000 units of antitoxin.

Persons known to have been exposed to infection should have cultures promptly taken from their throats and noses, and immunizing doses of 1,000 units should be given. In institutions, a physician experienced to serology may use the Schick test to advantage in eliminating those, naturally immune, from the number to be treated.

The machinery for controlling diphtheria is in our hands. Let us use it.—*Monthly Bulletin*, N. Y. State Health Department.

✱

Experiment with Natural Water-Softening Zeolite.—Experimenting with a natural hydrous

aluminum silicate in combination with calcium, which is capable of exchange with sodium in the raw state at a high rate and to at least as high a capacity as the synthetic product, R. N. Kinniard, chief engineer of the Des Moines Water Company, has succeeded in evolving a method of measurement of the rates of exchange in both directions of the reaction. He gave the following results to the Iowa Section of the American Waterworks Association, December 3. Des Moines city water, which has a total carbonate and sulphate hardness of more than 300 parts per million, has been softened in experimental filters. In the laboratory of Dr. Edward Bartow of the Illinois State Water Survey these Des Moines experiments have been duplicated with University of Illinois water having a total carbonate hardness of 300 parts per million. With a filter layer 2 ft. thick, rates of filtration of 2 gal. per minute per square foot and upward have been obtained with water of 300 parts per million hardness. This is equal to the rapid sand filtration rates and suggests the substitution of this natural medium either in gravity or pressure filters for municipal use.

Present information indicates that 4 lbs. of salt can be counted on to convert completely 1 lb. of equivalent calcium carbonate to sodium carbonate, and Mr. Kinniard feels justified in saying that the indications are that this can be reduced. Assuming a ratio of four to one, and 300 parts per million hardness, 10 lbs. of salt would be required to treat 1000 gal. of water. Salt is marketed in carload lots at \$3 or more per ton. Assuming \$5 per ton, the chemical cost would be $2\frac{1}{2}$ cents per 1000 gal., which figure can easily compete with lime and soda. The two processes, however, are not strictly comparable. The zeolite process gives a completely softened water without reducing the total solids. The lime process reduces the hardness by the amount of bicarbonates, while the soda process is only useful in that it converts calcium and magnesium sulphates to the sodium sulphates, which is exactly the same chemical substitution as is made by the zeolite.

Either alone or in combination with lime, Mr. Kinniard states, the zeolite process will be a most valuable finishing process.—*Engineering Record*, December 25.

Pneumonia.—In Rochester, every year between 300 and 400 people die of pneumonia. About 30 per cent. of the deaths are among little children, about 20 per cent. in middle life and about 50 per cent. in old age. Deaths from pneumonia would be very materially diminished if people would open their windows, wash their hands and keep their fingers out of their mouths; and if more attention were paid to the cleanliness of the teeth and mouth. One of the best ways to prevent pneumonia is to visit the dentist frequently; to brush the teeth and rinse out the mouth after meals, before breakfast and on going to bed; and not to have quack dentists anchor complicated dental bridges to rotten teeth. It is fair to predict, that when the new dental research work sets a new fashion in mouth cleanliness, then pneumonia will no longer remain the captain of the men of death.

In a former report, January of this year, reference was made to the work of Cole and Dochez on a new serum for pneumonia. This is not to be confounded with the shot-gun preparations put up by a notorious Michigan establishment. And, while much is to be hoped for the elaboration of Cole's method, much more will be accomplished by the prevention of pneumonia than in its cure by serums.—*Report of the Rochester Bureau of Health.*



Vermont and Venereal Disease.—An act to prevent venereal diseases was passed by the Vermont legislature at its last session. The act makes it a crime for any person knowing himself to be afflicted with gonorrhœa or syphilis to marry. Physicians are required to report cases of venereal diseases and the State Board of Health is required to make and enforce regulations for the quarantine and treating of cases of gonorrhœa.



California Endorses Federal Sanitarium Subsidy Bill.—The California State Board of Health has endorsed the federal bill which will provide for the payment of a subsidy to hospitals maintaining standards of equipment, diet, and care, established by the U. S. Public Health Service, and caring for tuberculosis patients who are not legal residents of the state in which they are.

This action was prompted in view of the following facts: the death-rate from tuberculosis

in California and other southwestern states is very large, reaching, for example, the rate of 362.5 per 100,000 population in one county of the state and a corresponding rate of 192.5 for the state as a whole; this high death-rate is largely due to the influx, from all parts of the country, of tuberculosis patients, who are, for the main part, in advance stages of the disease and financially unable to provide proper care for themselves, and moreover, unable to exercise proper precautions to prevent others from becoming infected; 75 per cent. of the patients dying of tuberculosis in California have an annual family income of less than \$1,000, furthermore, 27 per cent. of all children who have received state aid as orphans or half orphans during 1914 lost one or both parents from tuberculosis. There are only 906 beds available for tuberculous patients in county hospitals and the average yearly numbers of deaths is over 5,000. The counties cannot bear alone the double burden of caring for the resident and non-resident tuberculous, even with the recently provided state aid for the former. Recent investigations by the U. S. Public Health Service show that there is an annual migration of between 10,000 and 15,000 tuberculous patients to the western and southwestern states, and 30-50 per cent. of these die within six months of their arrival, and further, that 40-90 per cent. of all deaths from tuberculosis in the west and southwest are natives of other states.



Summary of the Annual Report of the Surgeon General of the United States Public Health Service.—The annual report of the Surgeon General of the United States Public Health Service records the largest amount of work performed in the history of that organization. Since the passage of the law of 1912 the public health functions of the Service have materially broadened, thereby increasing greatly its usefulness to the American people. Throughout the report the economic importance of disease prevention is made apparent to the reader.

Perhaps the most important achievement of the year was the discovery that pellagra is a deprivation disease, resulting from a faulty diet containing an excess of carbohydrates. While the final experiments which led to this discovery have only recently been completed, the conclusion itself is the culmination of investigations

extending over a period of seven years. The work has consisted of epidemiological field studies, actual feeding experiments conducted at numerous places in Georgia and Mississippi, and experimental research at Spartanburg, South Carolina, and other places.

A new national quarantine station was opened at Galveston, Texas, and the control of the Boston station was transferred to the Public Health Service. A great reduction in immigration has been observed during the year, with a corresponding increase in the number of aliens certified. At the Port of New York, the percentage has risen from 2.29, previous to the development of the European conflict, to 5.37 since that time; this increase largely being due to the fact that with the decreased immigration more time can be devoted to the examination. The number of cases treated at marine hospitals and relief stations exceeded 55,000, 15,000 of which were hospital patients, a considerable increase over previous years. The Coast Guard Cutter *Androscoogin* was fitted out as a hospital ship and now affords relief to deep sea fishermen on the Banks of Newfoundland.

On the occurrence of plague at New Orleans, the first outbreak upon the Gulf seaboard, the state and local health authorities requested the Public Health Service to take charge of the situation. Extensive rat-proofing and other anti-plague measures were undertaken, resulting in the eradication of the disease from among human beings, and the practical extermination of the rodent infection.

Great reduction in the incidence of malaria was obtained in localities where surveys were conducted. Drainage projects, rice culture studies and the conditions surrounding the impounding of water for power purposes were investigated in order to eradicate as far as possible the disease in these areas. Scientific investigations of malarial infection showed that in the latitude of this country the most important agent in carrying the infection through the winter season is man, and not the infected, hibernating, *Anopheles* mosquitoes as was pre-

viously supposed. From the standpoint of prevention this is a discovery of considerable value.

Studies of occupational diseases and industrial hygiene were instituted at several places during the year. A survey of the industries of Cincinnati was made to determine the cause of the prevalence of tuberculosis among industrial workers. The investigations relating to the migration of persons suffering from tuberculosis were completed.

Upon the request of the health authorities of five states, the organization and operations of the respective boards of health were studied and recommendations advanced for improvement in the powers and duties of these bodies. The health organizations of several cities were likewise investigated.

Investigations of the pollution of streams and the examination of shellfish were also conducted.

Trachoma was combated in the Appalachian Mountains, where it is most prevalent, over 12,000 cases being treated. Surveys in certain states during the year showed that the disease is not an uncommon infection.

Rural sanitation work was conducted in six different states and everywhere resulted in the reduction of typhoid and other communicable diseases.

Public health laboratories for the prevention of the interstate spread of disease were established at Chicago, Seattle, and numerous other railway centers.

Additional duties have been imposed upon the Service by extension of relief benefits to the newly organized Coast Guard and the physical examination of seamen applying for the rating of "able seaman." For this reason, and because of the greatly increased health functions of the Service, an increase in the commissioned personnel is recommended. An additional building for the Hygienic Laboratory and the establishment of a National Leprosarium for the proper segregation and care of cases of leprosy are also recommended.

Public Health Notes.

Rural Sanitation Grows. Government is to Open New Bureau in St. Louis.—St. Louis, Mo., is to become the headquarters of the federal Government's rural sanitation work. Dr. M. J. White, now in charge of the Marine Hospital in that city, will be in charge, for a time at least. The new bureau will call for an annual appropriation of \$30,000 to \$50,000 from the fund set aside for national sanitation work and from ten to twelve expert chemists will be needed.

The hygienic laboratory has been at Washington heretofore, but government officials have decided the work can be done better with St. Louis as a central point. New Orleans has such a station for research into prevention of malaria. Savannah, Ga., has a station for investigation of pellagra, and Pittsburgh has a station for work in industrial sanitation.

The entire sanitation work of the government is in charge of Dr. L. L. Lumsden of Washington, who will go to St. Louis to aid in establishing the new bureau. The work of rural sanitation by the government, Doctor White says, grew out of an epidemic of malaria seven years ago in North Yakima, Wash. About 3,000 persons were about to give up their homes, but the government sent physicians and chemists, who stamped out the disease. Since then rural sanitation has been regarded as a class of government work distinct in itself.

In many rural communities there was then a great need of instruction in sanitation. Some districts were much more healthful than cities, but, as a general rule, there was more danger of the spread of infectious diseases in the country than in the city.

"The great need of most rural districts," says Doctor White, "is common sense sanitation. The teaching of this is the great work of the bureau, together with the giving of aid when required. An important work is study of the causes of infectious diseases in rural communities."

Up to the present the efforts of the rural sanitation force has been confined largely to Alabama, Maryland, North Carolina, and Iowa, but with the establishment of the enlarged bureau in St. Louis Doctor White said that the work would become nation-wide in scope.—*New York Times*, November 19, 1915.

Improving Cancer Statistics in the United States.—The United States Bureau of the Census has instituted radical improvements in the collection and publication of the statistics of this disease. A special report on deaths from cancer in the United States during the year 1914 is in preparation and will be issued shortly after the first of the year.

In February, 1914, the American Society for the Control of Cancer suggested to the federal authorities that the figures of deaths from cancer in the United States Registration Area be published in greater detail, and that instead of being reported under only seven headings, as had been the custom hitherto, they be listed under many more titles according to the part of the body first affected, thus affording opportunity for more exact comparative study. This special monograph on cancer will consist of tables showing the deaths from cancer, according to the site of the disease, age, sex, color, nativity and marital condition, for the registration area, the several registration states and the usual subdivisions. Figures for white and colored will be shown separately for such counties and towns as have a colored population of 10,000, or at least 10 per cent. of the total. The new plan subdivides the seven titles for cancer in the International List of the Causes of Death into twenty-nine headings referring to the exact site of the disease. For instance, all deaths from "cancer and other malignant tumors of the buccal cavity" will now be reported under the separate subdivisions for cancer of the lip, tongue, mouth and jaw, and similarly with the other groups.

The Census Bureau also planned to increase the accuracy of the statistics by tabulating separately the returns in which the diagnosis was "reasonably certain" and those in which it was "uncertain." In arriving at this distinction a report is classed as "certain" if the diagnosis was confirmed by microscopical examination of tissues, or by surgical operation, or by autopsy. All cases of internal cancer in which the diagnosis was based on clinical observations alone are classified as "uncertain" regardless of any strength of assertion by the physician that the diagnosis was correct.

The improvement of cancer statistics has

practical bearings of greater consequence than may at first appear. Indeed, the importance of statistical investigation in arriving at the solution of the cancer problem is likely to be overlooked. Much of the valuable knowledge of the disease which we possess today has resulted from the collection and comparison of statistical data, and this method must be relied upon, side by side with experimental research and clinical observation, to elucidate the baffling problem of the nature and cause of this disease. The publication of this report by the Census Bureau should bring out new and useful information as to the prevalence of the disease in the United States and thereby contribute to the better understanding of its controllable features. Such a study as the Census Bureau is making, if continued, should also throw clearer light on the question of whether or not cancer is really increasing. By the progressive action of the Director of the Census data as to parts of the body affected on which such studies can be made will now become available for the first time in the official statistics of the United States.



Infant Mortality and Natural Selection.—

The *Texas Medical Journal* for December contains the following editorial, under the above title, thus showing another phase of infant mortality:

To state that two thirds of all deaths are due to heredity is rather startling. The casual observer would not likely attribute many deaths to this cause, but rather to conditions of environment.

Investigators, especially the school of Kare Pearson, have shown this to be true, and it is explained by them by the operation of natural selection in man. Death-rate is selective, and physical fitness is the criterion for survival. A heavy mortality leaves behind it a stronger population. The evidence lies in the fact that a high death-rate during infancy is followed by a lower death-rate during childhood. Part of children born in any district in a given year are doomed by heredity to premature death. This is due to a congenital lack of resistance to infectious diseases. In families of royalty, where environment is presumably the best, the death-rate from hereditary causes is 60 per cent.

This is not taken to mean that a high infant mortality is favored as a means of improving

the race, but to show how the law of natural selection operates in man just the same as in the lower animal and vegetable kingdoms.



Transmission of Pneumonia.—It may be remembered by older physicians that some of the European clinicians of the preceding generation, notably Johanessen, on purely clinical evidence advocated the isolation of pneumonia in consideration of the possibility that the disease may be transmitted from one person to another. The frequency with which pneumococci have been found in the mouths of normal individuals has until very recently seemed to preclude such a possibility, it seeming more likely that the infection might proceed from the patient's own mouth flora under conditions of depression of resistance or other localized vascular changes that favored the penetration of the pneumococcus into the lung. The studies of the last few years which have shown that pneumococci, though superficially alike, may nevertheless be separated, by agglutination reactions and protection experiments on mice, into a number of different types have made possible a return to the earlier point of view. It has been pointed out by these studies that the first three groups are disease-producing and give rise to three quarters of all cases of lobar pneumonia. A fourth group, which is responsible for about one quarter of pneumonia, are not easily distinguished from those normally found in human mouths. The other three, however, are easy to distinguish from the relatively non-virulent ones habitually inhabiting the mouth and pharynx. The highly virulent forms, moreover, of the first three groups, seem to grow in normal mouths only under special conditions. Dochez and Avery have found in pneumococcus infections with type I and type II the same microorganisms may appear in the mouths of members of the family or nurses in close attendance upon the cases. Such attendants may be "carriers" of this type for periods as long as 39 days, the average, however, being less than this. Patients recovering from pneumonia may harbor the organisms for considerable periods, varying in these studies from 12 to 90 days counted from the onset of the pneumonia. It is pointed out that both the healthy carrier who has obtained his organism from the case and the patient himself after recovery, may be active carriers

of virulent pneumococci. Inasmuch as these pneumococci are distinctly different from those found in the mouth normally, it is not at all unlikely that pneumonia may, like typhoid, diphtheria, and some other infections, be transmitted from person to person, at least in so far as the passing of the specifically virulent pneumococcus strain is concerned, this giving rise to the actual disease only in cases in which such transmission is coincident with physiological depression favoring the development of the infection.—*Journal of Laboratory and Clinical Medicine*, November.

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Typhoid Vaccines.—W. E. R. Schottstaedt, Fresno, Calif. (*Journal A. M. A.*, Nov. 13, 1915), says that the immunizing value of typhoid vaccines is generally admitted but there is some discord as to their use in treatment of the disease when discovered. No good index of immunity exists, but much careful work has been done, which he reviews. For his study five vaccines were employed, three of them made from the same strain, in two of which the bacteria were killed with 0.6 per cent. phenol (carbolic acid), and one in which the bacteria were killed by heating at 56 C. A fourth vaccine furnished by the California State Board of Health and the Mulford Typhoserobacterin bought in the open market were used. Twelve rabbits were taken, all about the same age. Two served as controls and the remaining ten were divided into pairs, one from each of the two litters used in each pair. The vaccine was injected into a vein of the ear. The summary of his investigations and his conclusions are as follows: There is a slight reaction following the injection of non-sensitized vaccines in rabbits, which is absent following the injection of sensitized vaccines. Vaccines killed by heat seem to be less active than those killed by the action of the phenol only. Washing the vaccine does not seem especially to influence its immunizing value. The height of the immunity curves occurs earlier after sensitized than non-sensitized vaccines, but the former appear to be only about one fourth as potent. The agglutinins practically disappear within three months after the first injection, while bactericidins and opsonins can be detected much longer. Opsonins increase more quickly than do agglutinins and bactericidins. Opsonins and bactericidins remain more permanent

than agglutinins, and immunity is more likely due to the former than to agglutinins. Sensitized typhoid vaccines are less potent than non-sensitized typhoid vaccines, probably because the bacteria of sensitized vaccines undergo phagocytosis and bacteriolysis more rapidly. In conditions in which a prolonged reaction is desired, as in conferring immunity, the non-sensitized vaccines seem preferable. In conditions in which no general reaction is wanted and a quick response of the protective powers desired, as in active typhoid fever, a sensitized vaccine would seem preferable.

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Vaccine Treatment of Gonorrhœa (Lieutenant W. G. Brett, *Brit. Med. Journ.*, August, 1915).—The author remarks that any method of treatment which shortens the period of detention in hospital of men suffering from gonorrhœa is worth a trial and is undoubtedly advantageous to the military authorities. Thirty-three cases admitted into hospital and suffering from acute gonorrhœa were treated with gonococcus vaccine and were discharged cured after an average detention of 13.5 days. In no case was the patient discharged until there had been an interval of four or five consecutive days since the appearance of the last sign of discharge. This works out an average of about nine days during which there were manifestations of active gonorrhœa. One cubic centimeter of gonococcus vaccine (Burroughs Wellcome), 200 million cocci was given, and the urethra washed out three or four times a day with weak permanganate. Two days after the first injection of vaccine a second dose was given of 1,000 million cocci, and unless the discharge showed symptoms of diminution in two or three days a third injection of 1,000 million cocci was given. The author thinks that failures with the vaccine treatment are chiefly due to insufficient dosage.—*The Journal of State Medicine*, London, November.

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Mouth Hygiene.—In inventive genius, tireless industry and efficiency American dentists lead the world.

The progress made in this profession is continuous, and the importance of mouth hygiene on one's general health is only beginning to receive the recognition it deserves.

Like all other fields of hygiene, its cultivation should begin at a time when life habits are being

formed. The care given to teeth during infancy will show beneficent results during the remainder of one's life. The old belief that the first set of teeth need no care is untenable, for upon the care given them depends in large part the degree of perfection attained by the second set.

Diseased gums, abscesses and decayed teeth have the same pernicious effect upon infants and children that they have upon adults. Swallowing the poisonous discharges from these sources deranges digestion, poisons the system at large, and frequently causes attacks of acute illness that result in an immense amount of disability and not a few deaths.

Within the last few years Rosenau, of Chicago, has proven that diseased conditions in the mouth have a profound influence in producing localized inflammatory disease processes in other parts of the body. The growing number of cases of rheumatism cured by the removal of diseased teeth or tonsils furnishes unimpeachable evidence of the soundness of his work.

Examinations carried on in schools and covering thousands of cases have shown that the number of children with unhygienic mouths approaches dangerously near to an even 100 per cent. Most of the defects can be included under decayed teeth, diseased gums or infected tonsils. In some children all of the three are found, and it requires no strain of the imagination to picture the evil results of swallowing day after day the poisonous germs and products of decomposition that are thrown off.

Until children arrive at an age when they are able to brush their teeth, this method of preserving them should be done by the parents. Filling cavities in the first teeth is not only a form of insurance against rheumatism and possibly organic heart disease, but it is of benefit in insuring a better permanent set of teeth. Diseased tonsils are a constant source of danger, and their removal is the only logical method of avoiding this danger.

Diseased gums and abscesses about the roots of teeth are curable. The amount of suffering and inefficiency they cause is enormous. From experiments carried out in one of the Cincin-

nati public schools by the Cincinnati Dental Society, it was estimated that dental care for all the children in the public schools would mean an annual saving to the city of \$50,000. This estimate was based on the time lost by children and the salary paid teachers.

Many consider dental work in public schools, paid for by general taxation, as a step toward socialism. It means greater efficiency, better health, and, in time of national danger, greater safety, for much of the disability suffered by the armies now at war in Europe is directly due to unhygienic conditions in the mouth. —*Bulletin Cincinnati Board of Health*, October 30.



The Hygiene of Pregnancy.—Dr. Joseph Cates, M. O. H., points out that not an inconsiderable proportion of stillbirths and premature births are due to want of knowledge of the simple rules of the hygiene of pregnancy, and of the steps to be taken at the onset of a threatened abortion. "One cannot avoid the conclusion," he says, "that incompetence and careless negligence on the part of certain midwives largely contribute to the same end. In a certain town during 1913 an inquiry into the circumstances of 68 stillbirths showed that over 50 per cent. occurred during the ninth month of pregnancy, and that 30 per cent. of the children were macerated at birth. The causes to which the deaths were ascribed were, injury or shock to mother, 10; ante-partum hæmorrhage, 6; difficult labor, 7; ill-health of mother, 18; inattention at birth, 7; other causes, 20. It is rare, even among the better class of well-trained midwives, that a systematic and careful inquiry is made of the time of engagement to detect those dangers which, left untreated, may jeopardize the lives of mother and child. Neither have midwives generally the facilities to provide those articles of clothing indispensable to a well-arranged labor and lying-in." Dr. Cates adds that adequate accommodation for cases of difficult labor and for ailing and delicate infants is practically non-existent even in our largest cities.—*Medical Officer*, London, October 23.

Industrial Hygiene and Sanitation.

Illumination Hygiene.—In the U. S. Public Health Service Bulletin No. 71 on "Studies in Vocational Diseases," J. W. Schereschewsky reports in considerable detail on "The Hygienic Conditions of Illumination in Workshops of the Women's Garment Industry." From the standpoint of industrial hygiene, in this particular trade, which involves a close and continuous use of the eyes, the prevailing illuminating facilities are very important. The data of the report show that only a little over 25 per cent. of the workers, whose visual acuity was tested, had normal vision in both eyes.

The average prevailing conditions of illumination upon working planes was computed, and the results so obtained were used to find out whether the basic principles of illumination were adhered to in the workshops of this industry. Where departures from these principles were found to be prevalent, recommendations were made upon a good hygienic and economic basis.

In this report the general principles of natural and artificial illumination are discussed with diagrams, with a compact summary of the principles of such illumination. Following this is an extensive discussion of the results of the investigation and a summary.

The general conclusions are:

1. Adequate provisions for illumination are particularly necessary in the women's garment industries, (a) because of the exacting visual demands of the occupation; (b) because of the presence of a large number of visual defects in workers in this industry (vide Part I).

2. Photometric measurements made during the summer of 1914 in a group of 34 typical workshops show that the illumination was inadequate in the case of a little over one-half the working planes measured.

3. Departures from correct principles in illumination were common in shops. The effects of such departures are to produce: (a) Inadequate illumination; (b) glare effects; (c) lack of uniformity in distribution of illumination; (d) troublesome shadows.



Cheap Insurance for Employees.—The Brooklyn Rapid Transit Company of New York City,

taking advantage of the fact that the collective insurance premiums of its employees amount to a large sum, has secured for them at their option what is said to be the cheapest life insurance ever offered under a group plan. For men under 32, the annual premium on \$1,000 is only \$7.28. Furthermore, one half of the premium is paid by the company and no physical examination is required if the employee applies for his insurance within six months of the date his length of service (two years) permits him so to apply. When a man is retired on pension the company assumes his premiums, so that he has a paid-up policy at that time. Should he leave the employ of the company for any reason, he can convert his insurance practically at its face value, including the premiums paid by the company, into a standard life or endowment policy without physical examination. Already 65 per cent. of this company's employees have availed themselves of this arrangement to take out policies on which their share of the premium will be \$28,000 annually. A like sum to be spent annually by the company will prove to be a good investment. It is a very encouraging sign to see the management of a large public-service corporation appreciating the value of spending a little money and effort in the interests of its employees. Action of this kind is well worth the study of engineers and contractors handling large numbers of men. —*Engineering Record*, January 15.



The Problem of Industrial Fatigue Among Munition Workers.—The war has created a demand for munitions out of all proportion to anything contemplated previously in this country. Overtime on a large scale and even Sunday labor became the rule, and soon statements were made that the health of the workers was being injured by the long hours. The government therefore appointed a committee of physicians, physiologists, officials and others to consider and advise on questions of industrial fatigue, hours of labor and other matters affecting the health and physical efficiency of munition workers. A report has been published on Sunday labor and industrial canteens, and a report is in preparation on such subjects as welfare supervision, hours of labor, the employment of women,

sickness and accidents. With regard to Sunday labor, the committee has come to the conclusion that it should be everywhere discontinued except for the tending of furnaces and other work which must be continuous. Except for quite short periods, continuous work is, in their opinion, a profound mistake, not only on social and religious grounds, but also economically, as the output is not increased. This is so not only because men become bored and wearied with monotony of the work, but also because over a large period the actual number of hours worked is found to be greater when the regulation weekly hours are reduced. Thus, in one case the regulation hours were reduced from $78\frac{1}{2}$ to $65\frac{1}{2}$ per week, yet the average number actually worked during the three months succeeding the change was 60 per week, while the average in the preceding six months was $59\frac{1}{4}$. The committee also thinks that the foremen and even the higher management require definite periods of rest even more than the manual workers.

On the subject of food the committee considers that industrial alcoholism is partly due to the lack of cheap good food. The provision of dining rooms near the factory and industrial canteens has been found to be a great improvement on going home for meals. After their establishment a reduction in sickness, less absence and broken time, less tendency to alcoholism, and increased efficiency in output were observed.—*Journal of the A. M. A.*

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Great Britain to Prohibit Lead Paints.—The British Departmental Committee, appointed to investigate the danger of the use of paints containing lead to the health of persons engaged in painting buildings, has recommended principally the enactment of a law prohibiting the importation, sale or use of any paint material containing more than 5 per cent. of its dry weight of a soluble lead compound. Certain exemptions

are recognized to be necessary, such as certain classes of colors, used by artists, and special branches of the painting industry, but in such cases it is considered desirable that the home secretary be given power to enforce adequate preventive measures. In order to give adequate time to the paint makers to arrange for the new type of supplies, and for the introductions of modifications in painting methods it is advocated to allow three years before enforcing the act, after the report has been published. The proposal to deal with the dangerous practices of the industry by regulation was regarded as impossible.

The white-lead industry in Great Britain in 1910 produced 58,000 tons, 85 per cent. of which was for home consumption. It employed approximately 2,500 persons with annual wages of \$750,000. The capital invested amounted to \$6,500,000. In lead mining approximately 2,700 persons were employed, with annual wage payments only slightly less than in the white-lead industry. It was estimated that the prohibition of the use of white lead according to the committee's recommendations would limit the demand for this material to 23,000 tons and would also reduce the demand for pig lead by about 25 per cent.

Among the persons employed as house painters in England and Wales, about 30 deaths from lead poisoning are reported each year. As to the number of non-fatal cases there are no complete statistics, since house painters do not come under the factory acts and reports of cases are entirely voluntary. However, the number of non-fatal cases is estimated at about 750 per annum.

Zinc paints will naturally take the place of lead paints, and though the production of zinc oxide is small, the larger call for zinc paints should stimulate an increase of production in this industry.

Legal Decisions.

Conditions Not Rendering City Liable for Typhoid Fever *City of Duncan v. Tidwell (Okla.)*, 150 Pac. R. 112.—The Supreme Court of Oklahoma reverses a judgment for \$675 obtained by plaintiff Tidwell, against the city of Duncan, as damages for typhoid fever suffered

by members of his family, and alleged to have been caused by the defendant's negligence in respect to the condition of its dumping ground, which was on a lower plane and 1,940 feet southeast from the plaintiff's dwelling house, about $2\frac{1}{2}$ miles northeast of the defendant city. In

this dumping ground it appeared that dead animals and human excrement, with other garbage, perhaps, were deposited in trenches 4 or 5 feet deep, the dead animals being covered with dirt and the excretions with lime and, when the trenches were about full, with dirt, although more or less of both were sometimes exposed. There was also some evidence tending to show an abundance of flies both at the dumping ground and at the plaintiff's house. The court holds that, in the absence of evidence reasonably tending to exclude other sources from which the *Bacillus typhosus*, causing typhoid fever, might have been derived, or to show that such bacillus existed in any of the matter deposited in the defendant city's dumping ground, it could not be inferred that members of the plaintiff's family contracted said disease from said dumping ground, located as above stated, notwithstanding that the winds had blown from that direction toward the plaintiff's dwelling house, and that there was an unusually great number of flies at said ground and at said house during the summer preceeding the attack of such fever. The court says that it ventures no opinion on the question as to whether the jury might have found that flies or dust could have carried typhoid bacilli from the dumping ground to the plaintiff's dwelling house, or to any place where the afflicted persons were, but it contents itself with pointing out that there was no evidence reasonably tending to prove that they did so, or that these grounds were the source from which the disease was contracted.—*Journal of the A. M. A.*

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Venereal Disease—Ground for Annulment of Marriage *C v. C*, 148 N. W. Rep. 865 (Wisc.).—The plaintiff, the wife, sued for divorce and the defendant, the husband, counter-claimed asking annulment of the marriage on the ground of fraud, in that the plaintiff was knowingly infected with gonorrhœa at the time of the marriage and had infected the defendant. These allegations were shown by the evidence and the lower court entered judgment annulling the marriage. In its opinion the supreme court said:

"Considerations of morality and health alike dictate that neither spouse should be compelled to submit to the indignity and menace presented by such an infection. The fact that, through the fraud and concealment of the guilty party, the other has, without his knowledge and consent, already been infected aggravates rather than palliates the fraud, and can not of itself be considered a confirmation of the marriage."

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A Decision on the Harrison Law.—NARCOTIC DRUGS; HARRISON LAW; AMOUNT WHICH A PHYSICIAN MAY PRESCRIBE NOT LIMITED *United States v. Friedman*, 224 Federal Reporter 276.—An indictment under the Harrison Anti-narcotic Law charged that the defendant dispensed, distributed and prescribed the drugs enumerated in the act in quantities larger than necessary to meet the immediate needs of a patient and did not distribute, dispense and prescribe the drugs in good faith and as a medicine. The defendant demurred to the indictment upon the grounds, among others, that the acts of the defendant stated in the indictment are not in violation of any law of the United States. The court said:

"As I understand section 2 of the act, the only thing required of a person, who shall give an order as provided in said section for the drugs mentioned in the act, is that he shall make or cause to be made, at the time of giving the order, a duplicate thereof, on a form issued by the Commissioner of Internal Revenue, and in case of the acceptance of said order he shall preserve such duplicate for two years. The defendant is not indicted for failure to do either of these last-mentioned things. . . .

"I fail to find in the act of Congress under examination any language making the doing of the things with which the defendant is charged a violation of law. In other words, there is no limit fixed to the amount of said drugs that a physician may prescribe, nor is there any duty imposed upon him, other than to keep a record of all such drugs dispensed by him, and the name and address of the patient, except those to whom he may personally administer, and that he must preserve the records for a period of two years."

Personal Notes

The following applicants have been elected to membership in the American Public Health Association:

Wm. Evan Lewis, 27 N. Fifteenth St., Allentown, Pa. Instructor in Chemistry, Lehigh University.

Geo. Van Ness Sheridan, 1998 Summit St., Columbus, Ohio. Executive Secretary, Ohio State Medical Association.

Frank E. Hale, Mt. Prospect Lab., Flatbush Ave. and Eastern Parkway, Brooklyn, N. Y. Chemist, Director of Laboratories.

Harry F. Ferguson, State Water Survey, Urbana, Ill. Sanitary Engineering, Illinois State Water Survey.

Thomas J. Murray, Agricultural Experiment Station, Blacksburg, Va.

Roy Walter Pryer, Board of Health, Detroit, Mich. Director of Laboratory, Detroit Board of Health.

Winfred De Witt Vosbury, 601 Market St., Camden, N. J.

John O. McDonald, 190 W. State St., Trenton, N. J. Physician.

Earl H. Cummins, 46 Westland Ave., Boston, Mass.

Frank Geo. Boudreau, M. D., 305 17th Ave., Columbus, O. Physician.

Richard Orin Webster, 1625 Transportation Bldg., Chicago, Ill. Bacteriologist, Bureau of Chemistry, Department of Agriculture.

Judd B. Kelly, 540 2d Ave., Detroit, Mich.

James J. Hagan, 331 Baldwin Ave., Jersey City, N. J.

Frank L. Kelly, M. D., 2241 Parker St., Berkeley, Cal. Physician.

Major-General William C. Gorgas received the Geographic Society of Chicago gold medal

for his work in the Panama Canal Zone, January 8, and addressed the Society on "Sanitation in its Relation to Geography." The honor conferred on General Gorgas has been conferred on but two occasions previously, once to Captain Roald Amundsen for the discovery of the South Pole, and, the second time, to Major-General George W. Goethals for the construction of the Panama Canal. While in Chicago General Gorgas also spoke on "Sanitation and Single Tax" at a banquet given in his honor January 10 by the Chicago Single Tax Club, the Chicago Medical Society, the Illinois Manufacturers' Association, the Chicago Dental Society, the Lawyers' Association of Illinois, the Women's City Club, the American Chemical Society, the Medical Reserve Corps of the U. S. Army and the Illinois National Guard.

✱

Dr. John S. Billings Designated Deputy Commissioner.—In order to carry on the large amount of administrative work heretofore performed by the Deputy Commissioner, Dr. John S. Billings, until now Director of the Bureau of Preventable Diseases, has been designated to act as Deputy Commissioner. His place as Director of the Bureau of Preventable Diseases has been taken by Dr. Bertram Waters, heretofore Chief of the Division of Tuberculosis in that Bureau. Dr. Clifford D. Martin will act as Chief of the Division of Tuberculosis. The changes are official designations by the Board of Health and carry with them no changes in salary or civil service titles.

✱

Dr. Samuel G. Dixon has been elected president of the Academy of Natural Sciences, Philadelphia, for the twenty-first time and executive curator for the twenty-fifth time.

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The Nutritive Value of Boiled Milk. Amy L. Daniels, Sylvia Stuessy.

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A Few Economic Facts of the Syphilis Problem. Donald Gregg.

A Chemical Aid in Securing Spirocheta Pallida from Syphilitic Lesions. Henry D. Lloyd.

A New Method of Tabulating Morbidity Statistics in the Medical Division of the Health Department of the City of Boston. Editorial.

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Delaware State Medical Journal, Wilmington.*V. September.*

Use of Liquid Chlorine for Sterilizing Water. J. A. Kienle.

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New Quincy Intake Characterized by Provision against Accumulation of Sand. Editorial.
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Smallpox and Quarantine. Editorial.
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THE EXTENSION OF PLAGUE INFECTION OF THE BUBONIC TYPE.*

R. H. CREEL, M. D.,
Surgeon U. S. Public Health Service.

ACKNOWLEDGMENT.

Acknowledgment is made to Doctor Juan Guiteras, Director of Sanitation of Cuba, for his kindness in furnishing the writer with data as to the cases of plague in Cuba, and to Sanitary Engineer H. P. Letton for assistance in preparing the various maps used in this article.

IN THE practical application of plague eradication or preventive measures most of the facts concerning plague infection and transmission stand revealed and well understood by the sanitarian.

Amongst the as yet unsettled plague problems is that of the relative importance of various agencies in introducing the infection into "clean" territory. Public health officers are still confronted with the following undetermined factors:

1st. The extent to which the traveling public disseminate plague infection by means of infected fleas on their person or in their baggage.

2d. The extent to which merchandise and freight in general convey infected fleas in the absence of their natural host.

3d. The relative incidence of plague transmission into "clean" territory by infected rodents hidden in merchandise.

4th. The rôle played by migratory infected rodents in transferring infection to new foci.

Chief interest centers on the first and second factors, for plague extension by third and fourth factors are admitted though it is not known to what degree of incidence.

The problem of plague extension by infected fleas in the absence of rodents resolves itself into the question as to whether infected fleas, when dispossessed of a host do remain or can exist on inanimate objects or whether their instinctive craving for blood is so great as to immediately urge them on to new hosts.

* Considerable light has been thrown on the migration of rats by an experiment performed in New Orleans subsequent to the preparation of this article. The results of the experiment were published in the *Public Health Reports* of June 4th, 1915.

Briefly, however, it may be stated that the intraurban travel of rats is widespread. A half grown Norway rat was captured nineteen blocks from point of liberation on the third day, and within two weeks a number of other rats were captured more than four miles from point of liberation.

The observations of Bacot and Martin on the inability of infected fleas to secure a satisfying feeding of blood inclines one to the assumption that the stay of such a parasite on other than living objects is very transitory.

The points at issue are not merely of academic interest but of considerable practical importance, for if infected fleas in merchandise are a factor in disseminating infection, logical preventive measures necessitate the fumigation of all freight, cargo and baggage emanating from an infected locality, but if they be a negligible factor, deratization of ships, rat-proof, rat-free cars, and the forwarding of merchandise from rat-proof buildings would seem to cover all rational quarantine demands by the "clean" localities against an infected point.

These problems are of greatest importance in applying rational preventive measures, for sanitarians in general are thoroughly alive to the necessity of avoiding haphazard measures and of limiting the restrictions to commerce and the traveling public to the minimum, compatible with safeguarding the health of their own country or community.

Various workers and observers in India have devoted no little consideration to these problems and some of them have arrived at definite conclusions.

Granting that their conclusions are logical the conditions in India are so different from those in the United States and its dependencies that such findings cannot be considered as

wholly applicable to the latter territory. The writer, therefore, presents some observations made along this line of study in San Francisco, in 1907-08; in Porto Rico, in 1912-13; in Cuba, in 1914; and in New Orleans, in 1914-15.

It is of interest, however, to analyze some of the observations and resultant deductions of the British Plague Commission in India, from which they conclude that plague is disseminated from one place to another by infected fleas carried in the clothing and bedding taken from an infected house—for this is their theory, that plague is chiefly if not invariably transmitted from one place to another by means of infected fleas in the absence of the infected rodent host.

The English workers in India dismiss the possibility of rodent migration and transportation of rats in merchandise as hardly worthy of consideration.

Numerous early writers in India made observations as to the probability of the infection being carried from infected to "clean" towns in the clothing and personal effects of plague patients.

Bannerman¹ in 1906 summed up the collective evidence of various writers and quoting from the reports on plague in the Punjab says—"The mode of introduction of plague in villages in the Punjab was considered from 'fairly definite' evidence" to be:

Human communication.....	88
Probably human communication	7
Clothes.....	25

¹ W. B. Bannerman. Spread of Plague in India. *Journal of Hygiene*, Vol. VI, 1906, p. 179.

Probably clothes..... 7
 Recrudescence..... 4

It is significant that of the specific cases cited by Bannerman in support of this contention the carriers of the supposedly infected clothes either wholly escaped infection or contracted the disease some time subsequent to arrival in the village and after other cases had been reported. However, brief mention is made of Aitkens' ² observation in 1899, on the possibility of rat migration. The latter not only refers to the migratory habits of the rat, but adds "and where its own legs would not take it (the rat) might be carried in carts and boats. The native craft in Bombay Harbor swarm with rats," etc.

Bannerman concludes that "as regards introduction into a new area remote from a focus of disease, it seems certain that human beings are the carriers of infection" continuing, he says "in support of this may be quoted the dictum of the collector of Thana ³ who says "the plague adhered to the railway and it almost confined itself to the area traversed by the local trains."

To the writer this observation can only be interpreted as meaning that plague adhered to routes of commerce and transportation of merchandise—for the traveling public was hardly "confined to the area traversed by trains."

In an investigation of plague in the

Punjab, Greenwood, ⁴ in 1911, studied the relation of extension of plague to railroads and concluded "villages near a railroad are subject to a higher rate of plague incidence than other villages"—but attributes this fact as "probably due to increased opportunities for personal transit, not to the importation of merchandise."

In the exhaustive report ⁵ of the Plague Commission in 1907 the English workers adduce further presumptive evidence tending to support the hypothesis of infection by fleas in clothing rather than by migratory rodents or transported rats.

In a study of plague in four different villages near Bombay they attribute the introduction of plague to clothing containing infected fleas.

In fixing the responsibility of importation of plague into the village of Sion, a woman named Pansi was considered the cause—for the reason that she had attended the funeral of a plague (presumably plague though the diagnosis was "asthma") patient in Bombay City five days prior to her trip to Sion. The woman herself never contracted plague nor any of the occupants of the house "A" at which she visited in Sion. If she actually carried infected fleas in her clothing, they remained on her person five days without biting her, which is rather incredible. House "A" failed to show infection though guinea pig "controls" were used. That a human case

² *Id.*, *Journal of Hygiene*, Vol. VI, 1906, p. 191.

³ *Id.*, *Journal of Hygiene*, Vol. VI, 1906, p. 195.

⁴ M., Greenwood. Sixth Report on Plague Investigation in India. *Journal of Hygiene*, Vol. XI, 1911, p. 47.

⁵ *Journal of Hygiene*, Vol. VII, 1907, p. 799. Observations Made in Four Villages in the Neighborhood of Bombay.

of plague later on developed in the adjoining house "B" was the circumstantial evidence that incriminated the woman Pasci as the introducer of plague in Sion. No statement is made as to the importation of merchandise from Bombay into Sion. As Bombay is the big distributing center of the nearby region it would seem probable that such must have occurred and with it the attendant possibility of transportation of infected rodents. That plague might have been residual in Sion, having remained latent in rodents from preceding epidemic season, also demands consideration. The case seems inconclusive and the visit of Pasci no more than a coincidence.

The introduction of plague into Wadhala, a village between Bombay and Sion, being one and one-half miles from the latter place, was attributed to three Chinese coolies, who worked in the plague laboratory in Bombay—although these men themselves remained free from infection. No statement is made as to the propinquity of the house occupied by the Chinese in Wadhala to that in which the first indigenous plague case occurred, and the inference is that the two structures were not close to each other.

The village of Parel was next studied. This place is a suburb of the city of Bombay and is coextensive with the city. No evidence was adduced as to the initial introduction of plague into the settlement by infected fleas. That the village was continuous with the city of Bombay, which was heavily infected, seems presumptive evidence that the epizootic of Parel was merely an extension of rodent plague from the city.

Warli was the fourth village on Bombay Island in which plague was studied, being about six miles from Bombay City. The introduction of the infection to Warli was attributed to a woman named Jankibai. Apparently well, she left Warli February 14, to attend the funeral of a nephew in Bombay, and while there nursed a plague patient in the house she visited in Bombay, and returned to Warli on February 19, ill with plague. Jankibai developed plague within three days after leaving Warli, which indicates the possibility that she had contracted the disease before leaving Warli for Bombay City. Three days is an average period for incubation of human plague notwithstanding the contention of the working party in this same study of Warli that it may be as short as twelve hours. Guinea pigs inoculated with massive doses of a virulent culture of plague or with plague tissue, almost invariably require two days or longer to develop symptoms, and survive five to ten days. It seems impossible that human beings could have less resistance than guinea pigs. The fact that dead rats had been noticed in Warli in the building just opposite to Jankibai's house on February 11, three days before she left Warli, increases the presumption that rodent plague prevailed in Warli before Jankibai's visit to Bombay City.

For several years previous these villages on Bombay Island had had human plague annually during the epidemic season, and from more recent studies on plague it would seem probable that in each place rodent plague had remained latent in a chronic or

resolving condition or by means of some other as yet unknown "bridge." Emphasis has been laid on this analysis of the studies of the origin of plague in the four Bombay Island villages, and in Bannerman's article, for the reason that the theory of transmission of plague by means of infected fleas in clothing has its strongest advocacy in the admirable work of these investigators and writers.

I believe, however, that they attribute too much importance to coincidence and do not sufficiently consider the factor of rat migration or transportation of rodents in merchandise.

On summarizing the observations of the workers in India their conclusions do not seem convincing, and notwithstanding their brilliant experimental studies the writer is inclined to agree with Ashburton Thompson⁶ in his statement that "in countries inhabited by races foreign to the observer in their language and mode of thought, who were of little instruction, of an education limited to ancient and immutable conventions and who lived for the most part under conditions which unavoidably obscured the phenomena . . . it has been impossible to acquire that exact and complete knowledge of all the circumstances under which the infection had been received by each person attacked."

Thompson,⁷ in a comprehensive study of plague, in Australia, concludes, "we have no ground for suspecting that the infection of plague can be spread by clothing, bedding or other articles of household use."

I would not go so far as to say that infection *cannot* be transported in this way. Observations in the United States and West Indies, however, lend support to the contention that such a means of spread must be rare. I have never seen an instance where infection was clearly traceable to such source.

Passing from a consideration of the studies of the investigators in India to the observation of plague in the United States, Porto Rico, and Cuba, it may be stated that the various obstacles presenting in India to a thorough investigation did not obtain in the latter localities. The studies of plague in this country were not confused by the question of endemicity of rodent plague or its recurrence, nor was there any doubt as to the reliability of statements such as English workers testify to as existing among the natives of India. The English investigators in India on several occasions mentioned the unreliability of statements made by the natives.

INTRODUCTION OF PLAGUE INTO CUBA AND PORTO RICO.

In a study of plague in the Islands of Porto Rico and Cuba, all the evidence pointed to an introduction of the infection into those countries by rats in merchandise. In San Juan, the port at which the infection entered Porto Rico, reliable testimony indicated that the first evidence of the epizootic was in the customs warehouse in which was stored imported merchandise. The watchman in this place stated at the time the first

⁶J. A. Thompson. Epidemiology of Plague. *Journal of Hygiene*, Vol. VI, 1906, p. 537.

⁷*Id.*, p. 541.

human case was reported (June 19), that he had noticed a month before (early in May) an unusual mortality among the rodents. Each morning on opening the building he would find a number of dead rats on the floor and "was puzzled because no poison had been distributed." The significance of this was not apparent to him until human plague appeared at a later date.

Much of the cargo in this warehouse came from the Canary Islands and consisted largely of crated garlic. Developments later on proved that plague had been for several years endemic in the Canaries, and during the course of plague eradication measures in Porto Rico it was likewise proven that crated garlic not infrequently harbors rodents, both rats and mice, the large mass of dried stems proving an attractive harboring and nesting place.

Further evidence that implicated the Canary Islands as the source from which Cuba and Porto Rico acquired plague infection was the fact that the only line of steamers calling at both Havana and San Juan was a Spanish line that brought Canary Island cargo.

The first case of plague in Havana developed in a wholesale grocery, located some distance off the water front, which had received shipments of Canary Island cargo such as garlic and other crated articles.

It is certain that plague was introduced about the same time in both San Juan, Porto Rico, and Havana, Cuba. The first evidence of the disease occurred in buildings receiving Canary Island shipments, in Havana, a human case, and in San Juan, infected rats

(presumably). Certain it is that no evidence was obtained in either place that indicated the infection had been brought in by persons or flea-infested clothing.

DIFFUSION OF PLAGUE IN SAN JUAN.

The first known human case of plague in San Juan was in the person of a truck driver who handled cargo from incoming ships. Practically on the same day, however, plague occurred in two other men whose infection was traceable to a warehouse in the center of the city. This warehouse was used almost exclusively for the storage of cargo from Canary Island ships. Subsequent to his recovery Case 5 stated he had seen sick rats in the warehouse when shifting merchandise. No rodent plague was confirmed from this warehouse, but a large number of mummified carcasses were found therein.

In order not to unduly prolong this article only such epidemiologic factors will be considered as pertain to the subject under discussion. These factors are:

1. Source of infection in each case of human plague.

2. Results in those instances wherein plague cases presumably contracted infection at place of employment, and later developed illness in residence with consequent exposure to fellow inmates.

3. Incidence of secondary cases among contacts irrespective of location of focus at which primary case acquired infection.

The term secondary is used in this article in its narrower sense, to design-

nate cases that might have been infected through fleas introduced by first case.

There were multiple cases in several premises in San Juan, Havana and New Orleans, but the cases appearing subsequent to the original one, were not considered as "secondary" when all the cases acquired infection from a common source, *i. e.*, infected rodents on the premises.

Plague in San Juan was recognized and officially reported present on June 19, 1912, after a period of three days' investigation and study. In reality Case 5 of the San Juan series was the first one diagnosed as plague. Cases 1 to 4 were at first not recognized as plague, the diagnosis being revised and the cases considered as plague subsequent to diagnosis of Case 5.

It is highly probable that unrecognized cases preceded these. Intensive trapping of rats was not immediately possible because of the remoteness of Porto Rico from an available supply of traps.

A sufficient number of rats were sent to the laboratory by the town-people, however, to determine, between June 22 and June 29, that the rodent infection was widespread, extending from the seagate of San Juan (indicated on map 1) inland two miles (marked on map as Case 14) and across the entire width of the city. Between June 19 and June 30, 23 cases of human plague were reported, located in all sections of the city.

The epidemic was so explosive in nature, cases appearing in different parts of the city; and so close together

as to incidence of time, that the extension of infection among the earlier cases from one human to another seemed improbable. The exposure to plague-infected rats at residences or business places seemed the only plausible explanation of such widespread human infection, the cases occurring as they did almost synchronously.

From Table I the following can be noted:

Multiple cases occurred in four different premises and solitary cases appeared in forty-one premises, including one at sea, and one in a street urchin the exact focus undetermined.

The former group embraced Cases 1 and 4; 5 and 6; 7, 8 and 10, and 47, 49, and 51. The group of solitary cases embraced Cases 2, 3, 9, 11 to 46 inclusive, 48 and 50.

Cases 1 and 4 were cousins living in a one-room frame shack built close to the ground, which formed excellent rat harborage. They worked at separate places of employment. As Case 4 developed symptoms twenty-four hours subsequent to Case 1, there remains the possibility that Case 1 may have brought home the infection to Case 4, thereby assuming that the incubation period of the latter did not exceed twenty-four hours, a very decided improbability. That Case 3, who lived two blocks distant, developed symptoms on the same date as Case 1 makes it very evident that plague rodents were present in the contiguous territory and lends probability to the assumption that Cases 1 and 4 acquired infection from a common source—infected rats beneath the floor of residence.

In these cases the epidemiologic observations were made in retrospect and are admittedly defective.

Cases 5 and 6 worked in same warehouse, but lived in different localities. Mummified rodents were found in the warehouse, but no infected rats were demonstrated therefrom. In both cases there were contacts at their respective residence but no secondary cases developed among them.

Case 5 is of interest because human plague subsequently developed in the immediate vicinity of his residence, the eleventh case on June 16—one day later, Case 13 on June 18 and Case 20 on June 22. This creates the possibility that Case 5 might have brought the infection from the warehouse to the locality in which he lived. Here again this would entail an incubation period of twenty-four hours in the person of Case 11. Case 11, however, lived in a separate apartment though in same tenement house as Case 5. Among several immediate contacts in same room with Case 5 there were no secondary cases, so the evidence points to the presumption that infected rats were on the premises of Case 11. Cases 7-8 and 10 sickened on the same date. They lived on the second story of a clean, well-ordered boarding house. No infected rodents were found, but evidence was adduced to the effect that on several mornings previously dead rats were found in the dining room and hallway. It was asserted that the dead rodents were brought up from a large grain warehouse below by cats belonging to the establishment; that the cats frequented the warehouse during the night returning to

the upper floor in daytime. No secondary cases developed subsequent to the date on which the three sickened though the place was well filled with other boarders. Cases 47, 49, 50 and 51 all apparently acquired infection at a common source. Cases 47, 50, and 51 lived in separate apartments in same tenement which was in process of being rat-proofed when Case 47 developed. Case 49 lived across the street but played about the site of Case 47, when the tenement was dismantled. Although a child of six, and being in intimate contact with its parents and brothers, no secondary case developed in the family of Case 49. Case 47 was also a child of six and the same conditions obtained as to contacts, but no secondary case of plague developed in the family. Case 51 was a three-year-old child, no other cases developed in its family. Case 50 was in the person of a young man who left the tenement when Case 47 was reported. He moved to a well-filled rooming house and was taken ill there, but no secondary cases developed.

While Cases 47, 50 and 51 were listed as from same premises; they lived in separate apartments and no evidence was obtained indicating contact between them, nor that any of them had contracted infection one from the other.

No rodent plague was demonstrated in this place, but mummified carcasses of rats were found on removing the floor of tenement.

Cases 5, 6, 9, 12, 17, 18, 19, 22, 23, 24, 26, 27, 35, 37, 39, 41, 42, 45, 49, and 50 all acquired infection at places

other than their immediate residence. Among these there was no instance of secondary cases in contacts although numerous persons were exposed and the contact was most intimate. On account of economic conditions in Porto Rico the poorer class live in small apartments, not infrequently a family of four living in one room.

In this group of 20 cases we can definitely say there was no evidence of transportation of infected fleas in the clothes of the infected person.

Cases 3, 11, 13, 14, 15, 16, 20, 21, 25, 28, 29, 30, 31, 32, 33, 34, 36, 38, 40, 43, 46, 47, and 51 were all solitary cases contracting infection at residence.

This group of 23 cases is of interest as supporting the view that the dispersal of infected fleas from rodents is not very extensive or, if so, the dispossessed parasites tend to seek other rodent hosts in preference to human beings. This factor is further considered under the discussion of plague in New Orleans.

Referring to Map 1, it can be seen that in the section of San Juan known as the "Old City" where the routes of travel were free and numerous, the rodent foci were not confined, but as the infection spread to the outskirts through Puerta de Tierra, Miramar and Santurce the rodent foci adhered to the main line of travel. The physical character of the city practically confines all outward travel to one highway. The absence of plague in Miramar was due to the fact that there were no acceptable rodent harborage, the highway being lined by vacant lots or dwellings of the better

class that proved unattractive to a migratory rodent. Leaving Puerta de Tierra behind, a migratory rodent would not find convenient harborage before reaching the section marked Santurce, and at this point rodent plague foci appear on the map. It will be noted that with the exception of cases 12, 17, and 24 (whose infection was traceable to Puerta de Tierra) all human plague likewise adhered to the highway of travel or to short distances radiating therefrom.

Further confirming the theory of diffusion of plague within San Juan by migratory rodents, rats were frequently seen running along the highway after night-fall.

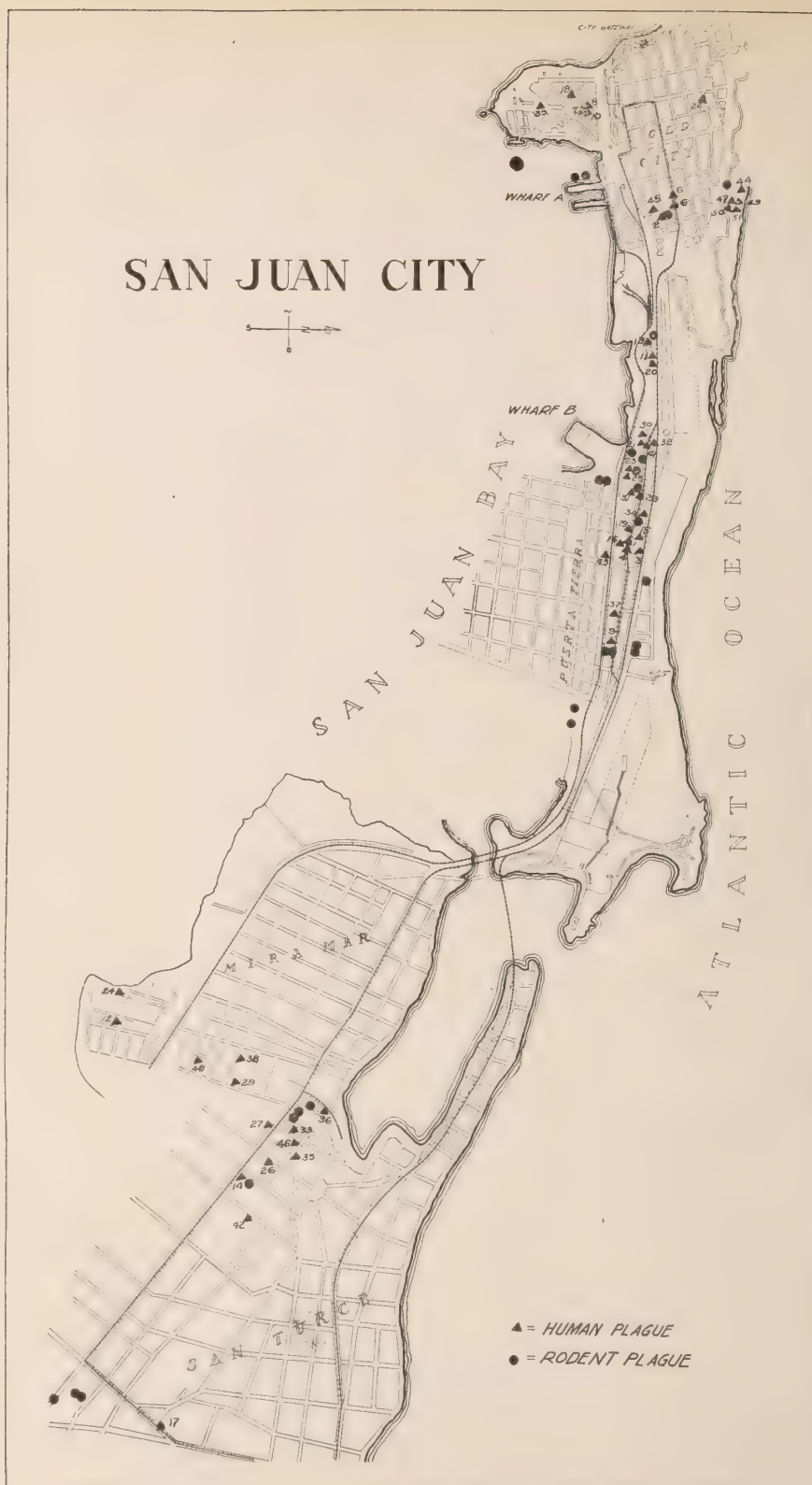
INTERURBAN SPREAD OF PLAGUE IN PORTO RICO.

Plague extended from San Juan to six other towns in the Island: to Carolina where there were both rodent and human cases, to Rio Piedras, Caguas and Arecibo where only rodent plague was found and to Dorado and Loiza, where only human plague occurred.

All of these towns, excepting Loiza, are located on railroad lines, Carolina, 14 miles from San Juan, Caguas, 23 miles, Dorado, 15 miles, Arecibo, 50 miles, and Rio Piedras, 3 miles;—Loiza, 17 miles.

Map 2 shows this extension of plague infection.

The first knowledge of plague in Carolina was obtained on June 27, when a laborer employed in a grocery warehouse developed symptoms. The man had not been out of Carolina for several weeks previously. The ware-



MAP 1. City of St. Juan, Porto Rico, embracing sections known as "Old City," Puerta de Tierra, Miramar and Santurce—The location of Human and Rodent Plague (epidemic of 1912) is indicated by symbols, the human cases numbered chronologically. The confinement of infection to lanes of rodent travel is noticeable.

TABLE I.
HUMAN PLAGUE CASES IN SAN JUAN, PORTO RICO.

Case No.	Date of illness.*	Source of infection.	Contacts at residence.	Secondary cases among contacts.	Remarks.
1....	June 10, 1912	Residence	One	None?	Case 4, a cousin, developed symptoms 24 hours subsequent to 1, presumably from same source of infection
2....	June 10, 1912	Residence	Not definite. A well-filled rooming house	None	
3....	June 10, 1912	Residence	Family of several people	None	Janitor of post-office. No secondary cases at place of employment or at his home
4....	June 11 or 12, 1912	Residence	Case No. 1	None?	Case 1 contracted infection about same date, dying day preceding Case 4
5....	June 15, 1912	Place of employment	Family of several people	None	Case 11 contracted illness on June 16 in adjoining apartment, presumably from infected rat, on premises
6....	June 16, 1912	Place of employment	One	None	Residence—tin roof single walls, elevated over marsh. Rat-proof
7....	June 15, 1912	Residence	About 12 people	None	Cases 7 and 8 and 10 developed synchronously in well-filled boarding house
8....	June 15, 1912	Residence	About 12 people	None	
9....	June 11, 1912	Stable where employed	Family of several people	None	Lived with parents, brothers and sisters
10....	June 15, 1912	Residence	See Case 7	None	See Cases 7 and 8
11....	June 16, 1912	Residence	Uncertain	None	Lived in tenement adjoining Cases 5 and 13. Number of immediate contacts not ascertained
12....	June 17, 1912	Docks	Family of several persons	None	No cases developed in the vicinity of his home
13....	June 18, 1912	Residence	Several families	None	Case 13 developed within 100 feet of Cases 11 and 20 in well-filled tenement house
14....	June 20, 1912	Residence	Family of several persons	None	Infected rodents found beneath flooring of house at time of discovery of case
15....	June 19, 1912	Residence	Family of several persons	None	
16....	June 17, 1912	Residence	Family of several persons	None	Case 16 occurred in small frame shack within 50 feet of Cases 1 and 4

* Indicated by appearance of bubo or high elevation of temperature.

TABLE I.

HUMAN PLAGUE CASES IN SAN JUAN, PORTO RICO.—*Continued.*

Case No.	Date of illness.*	Source of infection.	Contacts at residence	Secondary cases among contacts.	Remarks.
17.....	June 20, 1912	Employment	Family of several people	None	Man was city salesman who solicited orders in Puerta de Tierra, the only presumptive source of infection. No case developed within $\frac{1}{2}$ mile of home
18.....	June 20, 1912	Employment	Family of several people	None	Blacksmith in "Old City" lived in second story of nearby house
19.....	June 21, 1912	Stable where employed	Family of several people	None	Source of infection uncertain, either residence or employment
20.....	June 22, 1912	Residence	Family of several people	None	Lived in tenement apartment adjoining Cases 11 and 13
21.....	June 22, 1912	Residence	Family of several people	None	
22.....	June 23, 1912	Unknown	Family of several people	None	School-boy playing about town
23.....	June 27, 1912	"	Family of several people	None	Garbage collector
24.....	July 1, 1912	Place of employment	Family of several people	None	Street vendor in Puerta de Tierra. Lived in rat-proof house 2 miles from Puerta de Tierra
25.....	July 3, 1912	Residence	Family of several people	None	Plague infected rat caught on July 4, 25 feet from house
26.....	July 3, 1912	Residence of Case 14 ?	Family of several people	None	Child had been playing at site of dismantled house where Case 14 had lived
27.....	July 4, 1912	Residence (In rear yard)	Family of several people	None	Residence well elevated (8 feet), infection presumably contracted in rear yard at a rat-infested shed
28.....	July 5, 1912	Residence	Family of several people	None	Tenement house
29.....	July 6, 1912	Residence	Family of several people	None	Child had been awakened shortly before illness by rat falling in bed
30.....	July 6, 1912	Residence	Family of several people	None	
31.....	July 10, 1912	Residence	Family of several people	None	Case of 9-year-old child
32.....	July 11, 1912	Residence	Unknown	None	Lived in well-filled boarding house. Numerous contacts
33.....	July 12, 1912	Residence	Family of several people	None	Girl of 22 years, living with family

* Indicated by appearance of bubo or high elevation of temperature.

TABLE I.

HUMAN PLAGUE CASES IN SAN JUAN, PORTO RICO.—*Continued.*

Case No.	Date of illness.*	Source of infection.	Contacts at residence.	Secondary cases among contacts.	Remarks.
34.....	July 15, 1912	Residence	Family of several people	None	Infected rat caught on premises, June 30
35.....	July 19, 1912	Street	Family of several persons	None	Authoritative evidence to effect that child had played with dead rat in street a few days before onset of symptoms
36.....	July 19, 1912	Residence	Family of several persons	None	Young girl living with parents
37.....	July 22, 1912	?	?	None	Lived in room alone—no immediate contacts, but 10 families had habitations in same building
38.....	July 22, 1912	Residence	Family of several people	None	Youth of 20 years living with his family
39.....	July 28, 1912	Street ?	Unknown	None	Street urchin—no home, found sick in the street
40.....	July 28, 1912	Residence	Family of several people	None	Child of 11 years, lived in tenement house with family
41.....	July 20, 1912 Chronologically should follow Case 23	San Juan Not definitely known	Crew of 7 persons	None	Case occurred on board small schooner two days out from San Juan. Infection attributed to latter place as vessel had been fumigated before sailing and was presumably rat-free
42.....	July 18, 1912	Vicinity of residence	Family of several persons	None	Boy of 16, lived in well elevated cottage, single walls and ceilings, rat-proof. Infection contracted elsewhere
43.....	Aug. 5, 1912	Residence	Family of several persons	None	
44.....	Aug. 13, 1912	Residence	None	None	Lived alone in basement dwelling
45.....	Aug. 26, 1912	Employment	Family of several persons	None	Lived with uncle's family in non-infected district
46.....	Aug. 28, 1912	Residence ?	Family of several persons	None	Nurse and cook to family of four, including two children
47.....	Sept. 2, 1912	Residence	Family of several people	None	Lived in adjoining apartment to Case 51
48.....	Aug. 29, 1912	Residence ?	None	None	Lived alone in apparently rat-free house. Source of infection speculative

* Indicated by appearance of bubo or high elevation of temperature.

TABLE I.
HUMAN PLAGUE CASES IN SAN JUAN, PORTO RICO.—*Concluded.*

Case No.	Date of illness.*	Source of infection	Contacts at residence.	Secondary cases among contacts.	Remarks.
49.....	Sept. 6, 1912	Site of Case 47	Family of several persons	None	Child played at nearby site where residence of Case 47 had been dismantled
50.....	Sept. 7, 1912	House of Case 47	Not definite. Rooming house with several people	None	Case had lived in same tenement as Case 47 but had moved to another part of the city when Case 47 was discovered, on Sept. 2
51.....	Sept. 8, 1912	Residence	Family of several persons	None	Child in arms, 2 years old, neither parents nor three other children in same family were infected

* Indicated by appearance of bubo or high elevation of temperature.

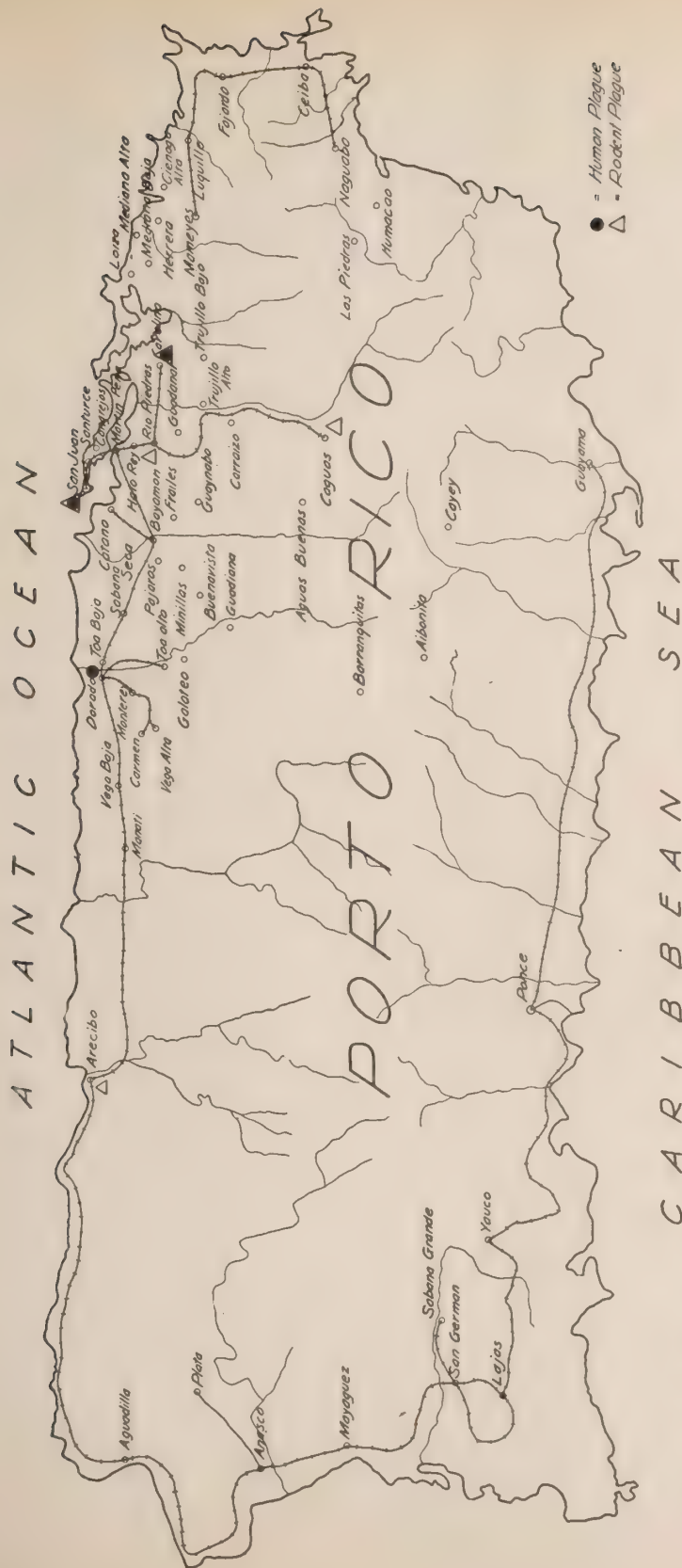
house imported large quantities of San Juan merchandise and the man was engaged in handling this freight. Plague rats were found on the premises and the infection spread to surrounding property. There was extensive travel from Carolina over country roads into the surrounding country but the infection did not extend except in the person of one man who had slept in Carolina three days previous to onset of symptoms. This case died in Loiza, a village four miles distant from Carolina. There was no subsequent development of rodent or human plague in Loiza.

In the town of Rio Piedras, located three miles from San Juan, a solitary plague-infected rat was found dead on the highway leading into the town from San Juan. No other plague infection, human or rodent, was discovered, although intensive trapping was employed and many rats were

captured as result of summary destruction of rodent harborage. The most acceptable theory of the transmission of this infection was that of transmission by migratory rodent from San Juan.

Conditions in Caguas were early brought to attention by the authenticated report that a number of rats had been observed escaping from a carload of fertilizer imported from San Juan. This report was confirmed and further evidence was obtained that on other occasions laborers had seen rats in cars from San Juan. Trapping was instituted in Caguas with the result that on varying dates between September 23, and December 21, four infected rats were captured on separate premises. No human cases developed. The first plague rodent was taken in a grocery receiving merchandise from San Juan.

In Arecibo, a railroad city, fifty



MAP 2. Island of Porto Rico, showing Plague Infected Localities. Solid circle indicates demonstrated human infection, triangle rodent cases, and circle within triangle rodent and human infection.

It is to be noted that infection was confined to towns located on railroads, crossed line indicating R. R. line.

miles from San Juan, two infected rats were caught on different dates, but no human cases developed at this place.

The history of the human case in the town of Dorado throws considerable light on the probable source of the Arecibo infection. The Dorado case further shows the danger of confusing coincidence with real cause. This case developed symptoms on July 11, dying on July 13. Dorado is a small village that presented no evidence of any considerable rat harborage at time the case was reported. No rodent infection was found there although a thorough rodent survey was accomplished. At first the evidence of infection seemed connected with the visit of a relative from San Juan. The latter had come to Dorado on July 3, eight days prior to the development of the case. She had brought with her a small package of her clothing and had returned to San Juan on July 4. She made a second trip from San Juan to Dorado on July 11, the date on which the boy became ill. The evidence at the time the case was discovered was to the effect that the patient had not been away from Dorado and despite the fact that the San Juan relative never developed plague, and did not come from a plague-infected district, nor had been in contact with any plague case in San Juan, it was assumed that the Dorado infection must be in some way associated with her visit. Later on, the fact was disclosed that the case, a boy of 13, had, on July 8, ridden from Dorado to Arecibo as a stowaway in a car containing merchandise from San Juan. That

this ride took place three days before onset of symptoms and in connection with the appearance of rodent plague at a later date in Arecibo seems conclusive evidence that the boy was infected while in the car.

That there was no cases of plague amongst the freight handlers at Arecibo can be explained by the assumption that there were in the merchandise live rats that furnished suitable hosts for any remaining infected fleas. It may further be observed that the boy did not carry infection into Dorado upon his return.

In summarizing interurban spread of plague in Porto Rico it may be stated that the infection adhered to the railroad, despite the fact that a very large proportion of the travel out of San Juan is across country; this was specially so during the early days of the epidemic, when thousands left San Juan in a panic, upon the announcement of the presence of plague. The examination of rodents from a large number of towns having communication with San Juan by highways only failed to disclose any plague infection.

As soon as possible a strict supervision was enforced on outbound freight. While this was in force 57 rodents were found in merchandise, and this number was probably augmented by those rodents killed by fumigation and remaining undiscovered within packages. Crated garlic, boxed hams, crated carboys, household furniture and crated chinaware were some of the articles containing rats. A consignment of cage traps upon arrival at San Juan contained several dead rats within traps. In

the express office a black rat with three young was found in a telescope valise. The valise had been partially opened and had so remained for several days prior to shipment permitting access to the rat, which had entered and littered.

DIFFUSION OF PLAGUE IN HAVANA.

The introduction of plague into Havana has already been mentioned. The first case occurred in June, 1912. Some three or four human cases were discovered at this time, but search for rodent plague was without result. These cases, marked "A" on Map 3, all worked and lived in a closely confined area, and due to the intensive suppressive measures inaugurated by the Cuban Department of Sanitation the infection did not spread, but was apparently obliterated. That the eradication was only apparent and not real became evident some eighteen months later when, on February 23, 1914, a human case developed in a block contiguous to that in which the infection had appeared in June-July, 1912.

Human cases occurred in Havana during the following March, April, May and June, and are recorded in Table 2 and numbered on Map 3, accordingly as they were reported or bacteriologically confirmed. It can be noted that the cases occurred in a fairly direct line leading southward along the contour of Havana Bay, but inland some three or four blocks. This route of travel was confined to the location of wholesale provision

warehouses. The focus where Cases 10 to 14 inclusive acquired their infection was some distance from focus of Case 9, but was near the water front and in direct extension of the curving line connecting the previous foci. Cases 1 to 9 inclusive, 15, 20, 26, and 27 were strikingly similar. All were young male Spaniards, laborers in wholesale provision establishments, working for the most part in bare feet, handling incoming and outgoing freight.

Cases 10 to 14 were laborers at a large stable of the Department of Public Works. At this stable two rats found dead were proven to be plague-infected. From the curved line of travel extending from location of Case 1 to that of Case 14, the infection spread inland to focus of Case 18.

Guiteras⁵ considered that the focus at the government stable was attributable to infection brought to the place by dead infected rats, or infected fleas in the garbage. Not infrequently a wagon load of garbage would remain at the stable yard several hours while en route to the final disposal.

Considering the large number of dead rats that are thrown into garbage this assumption of the origin of infection at above mentioned focus seems more plausible than the theory of introduction by migratory rodents.

There was no connecting link between focus of Cases 10-14 and that of Case 18, excepting the assumption of migratory rodents. From location of Case 18, the infection extended several blocks to that of Cases 22 and 23,

⁵Guiteras. *Peste Bubonica Sanidad y Beneficencia. Boletín oficial de la Secretaría (Cuba)*, September, 1914.

again by the presumptive link of migratory rodents from premises of Case 18.

Guiteras⁹ inclines to the belief that the extension of plague, both intra-urban and interurban is by infected fleas on rats in merchandise or infected fleas on used sacks, and is of the opinion that migratory infected rodents are a negligible factor except for the transfer of infection for short distances, say from one house to adjoining one.

If one accepts the rodent survey in the Havana epidemics on its face value this hypothesis would be entirely tenable, for with such a low percentage of rodent infection the spread of plague would necessarily depend upon transportation of infected fleas. There were no infected rats discovered in the campaign of 1912, and only two in 1914, and these latter were from a number found dead in the government stables in which five human cases contracted infection. Considering the prevalence of human cases in Havana it must be perfectly obvious that the rodent survey during both epidemics was so faulty as to be of no value. There is no reason to assume that the rodent population in Havana was less susceptible to plague, or escaped infection in any greater degree than the rats in Porto Rico or New Orleans. Eradicative measures in Cuba have been predicated largely on the flea transportation theory, and fumigation and disinfection has been vigorously prosecuted. Probably in no other place has fumigation been so

efficiently done as in Havana, but despite this Havana has recently (February, 1915) experienced its third epidemic of plague or the second recrudescence from the original infection of 1912.

In 1907-8 the United States Public Health Service under the direction of Surgeon-General Rupert Blue eradicated plague from San Francisco and it has not reappeared in that city to this day.

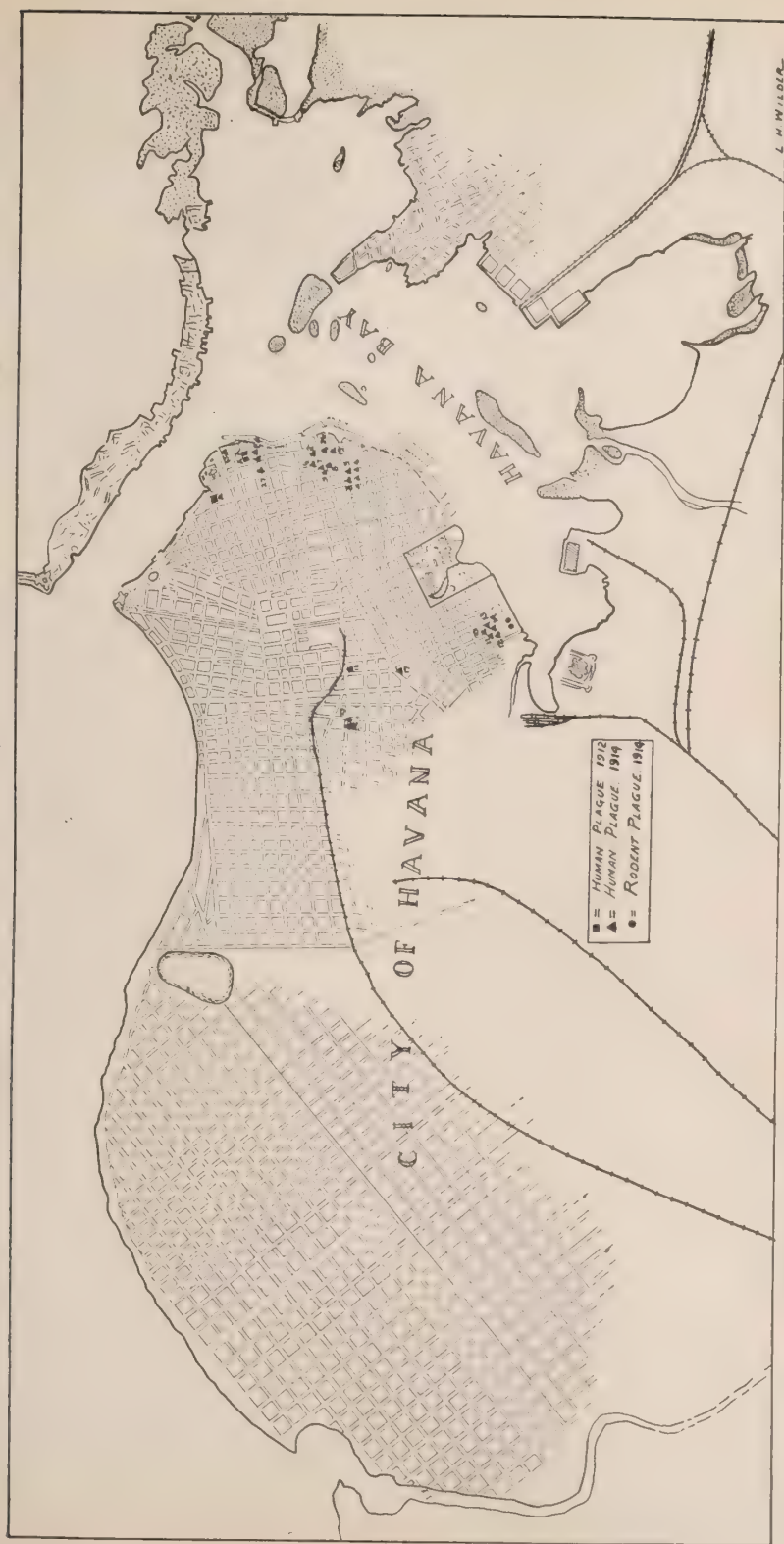
In Porto Rico¹⁰ a Service force achieved the same result in 1912. In both latter places the campaign was waged on the assumption that the intraurban extension of infection is by migratory rodents, and the efficacy of fumigation of the habitation of human cases as an eradicated measure was given very little weight.

If eradication results are any index then the argument of rodent migration versus flea transportation is strongly in favor of the former.

Guiteras unqualifiedly attributes the infection of Cases 3, 4 and 5 to infected fleas on empty sacks that had presumably come from infected warehouses. These three cases all acquired infection on the same day, so it is only logical to assume that a large number of fleas must have been dispersed throughout the premises. Previous to this event only two other cases had occurred, the first one (No. 1 on Map 3) at 1 Officios Street; the second at 57 Officios (No. 2 on Map 3) in a direct line and midway between location of Case 1 and that of Cases 3, 4, and 5, at 114 San Igna-

⁹ *Id.*, p. 316.

¹⁰ U. S. Public Health Service Reports, No. 130-1913.



MAP 3. City of Havana, Cuba, showing location of Human and Rodent Plague Cases in 1912, and 1914.

cio. The second-hand sacks stored in 114 San Ignacio Street were not definitely traced to any previously infected premises, but in a general way came from the various wholesale houses in surrounding district.

The writer personally knows that the day previous to onset of symptoms in Cases 3, 4, and 5, a large number of empty second-hand sacks from the infected building were sent across the Bay and stored. That no infected fleas were transported therein seemed evident because the watchman slept in the room containing these imported sacks without contracting infection. A large number of sacks were sent across the Bay from Havana at different times but no infection has ever developed in these suburbs on the side of Havana Bay opposite the city. Other places in Havana bought and sold used sacks without infection developing therein.

Followed to its logical conclusion this theory of flea transmission on empty sacks would lead to the pre-supposition that vastly greater numbers of fleas adhered to the sacks transferred to 114 San Ignacio than remained at origin of sacks, for in the known infected premises only solitary cases occurred, and in any (unknown) rodent-infected premises no human cases had occurred. As solitary cases are the rule in infected premises the most logical explanation of multiple cases is the dispersal of large numbers of fleas from a dead infected rat. Quite often an infected rat may have but few fleas, but instances have been recorded of over three hundred (300) fleas on a single infected rodent, and

the writer inclines to the belief that some such heavily flea-infested rat was the cause of the multiple cases concurrently attacked with plague at 114 San Ignacio.

Another argument against the flea transportation theory as an explanation of the spread of plague in Havana lies in the fact that the infection adhered, during the first six weeks of the epidemic, to the wholesale warehouse district, despite the fact that these establishments were the source of supplies to retail shops widespread through the entire city of Havana. This argument applies with even stronger force to the conditions of the 1912 epidemic, when the cases were even more closely localized within the wholesale commercial section despite the despatch of supplies to the outside districts.

Another circumstance that supports rodent migration rather than transportation of fleas in merchandise as the cause of dissemination of plague in Havana is that of the repeated intervals of latency of infection. The infection remained dormant (possibly active, though unknown, among the rodent population) on one occasion eighteen (18) months, on another eight (8) months. At each renewed apparition of human plague, the infection has appeared in an additional part of the wholesale commercial section. It seems wholly improbable that infected fleas could bridge over this interval between human cases. Plague in rodents either of a resolving condition or some similar state is the most plausible explanation of the apparent dormancy of infection.

The origin of the infection of Case 17 was debatable. The man, a street vendor of fruit, had in his possession gunny sacks from the infected government stable. These had been secured for the purpose of procuring his supply of fruit from the market. As the case proved fatal, no definite information was obtainable as to his travel during the time prior to his illness, but it is only reasonable to assume that if he had business relations with any one at the stables he must have visited the place. The manner in which Case 17 acquired infection is admittedly a matter of conjecture.

By reference to Table II it can be observed that Cases 1, 7 to 14 inclusive, 16 and 17, acquired infection at place of occupation but did not convey infection to their residences. In this group the contacts at residences were numerous and the contact intimate, yet no secondary case developed. It is noteworthy that none of the five cases at the government stables transferred the infection to his residence, although the men were of a class most liable to retain fleas on their person—hostlers, drivers, laborers on garbage wagons, etc., whose personal habits would be very conducive to flea infestation.

Cases 2, 15 and 20 acquired infection on ground floor of the establishment, yet did not convey infection to their fellow employees who slept in a common dormitory on the upper floor. It can be definitely stated that there was no known case of plague in the Havana series in which the infection could be attributed to the conveyance of infected fleas in clothing,

nor was there, in the opinion of the writer, any instance of transmission of infection by fleas in the absence of a rodent host except that of Case 17. The manner in which this case acquired infection was problematical, for a possible visit by him to infected government stables prior to the infection cannot be excluded.

Apparently the chief obstacle in the mind of the Cuban authorities to acceptance of the rat migration theory was the separation of human cases by a presumably non-infected territory. The unreliability of the rodent survey precludes the assumption that rodent plague did not exist in the intervening territory. The writer by no means considers that the presence of a plague-infected rodent is necessarily followed by the appearance of human cases.

Reference to maps of San Juan and New Orleans will make this perfectly evident. A plague-infected rodent was found dead within ten feet of the writer's office and in a yard wherein several men were attending to daily labors, and passing within a few feet of the dead rodent which was hidden beneath planking temporarily placed on the ground. The rodent's body was relatively free of fleas. Similar conditions are undoubtedly frequent in plague epizootics and epidemics, and the escape from infection by humans intimately exposed is readily explainable on the theory that the infected rat may be relatively free of fleas or that there are other rodents present to accommodate infected fleas that have abandoned the dead one.

Referring to Map 4 it can be seen that human Case 19, in the New Orleans

TABLE II.
HUMAN PLAGUE CASES IN HAVANA 1914.

Case No.	Date of illness.*	Source of infection.	Contacts at residence.	Secondary cases among contacts.	Remarks.
1.....	March 1	Employment	Family at residence	None	Youth lived with family of unknown size in distant part of city
2.....	Feb. 23	Employment	Several fellow employees in large wholesale grocery	None	Lived above grocery in dormitory with several fellow employees
3 } ...	March 24	Employment	Several fellow employees in large wholesale grocery	None	Three cases contracted infection on same date—wholesale grocery
4 } ...					
5 } ...					
6.....	April 11	Employment	Several fellow employees in large wholesale grocery	None None	Laborer in wholesale grocery
7.....	April 11	Employment	Indefinite—lived in lodging house	None	No cases occurred at residence which was some distance from employment
8.....	April 12	Employment	Indefinite—lived in lodging house	None	No cases occurred at residence which was some distance from employment
9.....	April 12	Employment	Indefinite—lived in lodging house	None	No cases occurred at residence which was some distance from employment
10.....	April 16	Employment	Fourteen	None	Cases 10 to 14 inclusive worked at government stables where plague rats were found; all lived some distance from stable and in separate neighborhoods with varying number of contacts. In no instance was infection transferred from stable to any residence.
11.....	April 16	Employment	One	None	
12.....	April 19	Employment	Fourteen	None	
13.....	April 26	Employment	Eight	None	
14.....	April 26	Employment	Eight	None	
15.....	April 30	Employment	Indefinite, a number of fellow employees	None	Laborer in wholesale grocery lived in place of employment
16.....	April 30	Unknown	Three	None	Young boy living with his family
17.....	May 2	Unknown	Two in same room. 42 in lodging house	None	Street vendor—gunny sacks in which he kept oranges said to have come from government stables
18.....	May 15	Employment	Three	None	Worked and lived in warehouse
19.....	May 25	Residence	Six	None	Housewife, lived with her family of five persons
20.....	May 26	Employment	Three	None	Worked in wholesale grocery, lived with fellow employees on second floor

* Date discovered by Sanitation Officials.

series, was located more than a mile distant from any previously discovered human case. Had the rat survey been inefficient the conclusion might have followed that the infection had been borne this long distance from other human foci. Instead of being reduced to erroneous assumptions it was perfectly evident from results of rodent survey that rodent infection spaced at intervening points spanned the distance and led out to Case 19. Moreover, despite intermediate rodent foci, there was no intervening human plague.

In summarizing, the writer is of the opinion that in Havana migratory rodents were responsible for the spread of infection in the area between the location of Case 1 and that of Cases 3 to 5; that the infection may have been transmitted to the government stable by dead infected rats in garbage wagons; that from this point the spread to location of Cases 18, 22 and 23 was by migration of infected rats. This conclusion is based on the fact that human cases were confined to food depots such as wholesale provision stores or stables (all of them places that would induce greatest rat infestation) that the human foci appeared in fairly orderly direction of extension and that the cases occurred at varying intervals of time. Had the transportation of infected fleas on sacks or in merchandise been responsible for the infection of human cases the epidemic would have been more "explosive" in nature and the cases should have spread more synchronously, more widespread and distributed to some degree in the purely

residence district. Such was not the case.

However, the value of the study of the Havana epidemic was minimized by the lack of a dependable rodent survey. Too many influencing factors had to be determined by deduction.

INTERURBAN SPREAD OF PLAGUE IN CUBA.

The infection extended from Havana to the town of Artemisa, 30 miles southwest of Havana; to San José de Lajas, 15 miles southeast; to Jaruca, 21 miles eastward and to Santiago de Cuba, a seaport city 400 miles east of Havana. All of these places were located on the railroad and received Havana merchandise.

A human case of plague appeared in Artemisa in a young clerk in a grocery store that received merchandise from the infected district in Havana. Some three or four days prior to his illness the patient had noticed a sick rat in the store and had killed it. As the animal was heavily flea-infested he threw coal oil on it and burned it. No other cases occurred either rodent or human.

One infected rat was discovered in the railroad warehouse at Jaruca. This structure was of galvanized iron with concrete floor and received Havana merchandise. The infection did not extend further than this building nor were there any subsequent human or rodent cases.

The infection at Santiago was first discovered in a wholesale warehouse receiving merchandise from Havana. Rodent and human cases followed. Guiteras ascribes the introduction of

the infection to rats in the freight imported from Havana. Santiago is a seaport so it is uncertain as to whether the transportation was by rail or water.

The case of plague at San José was in a similar way attributed to freight—infected rats in merchandise from the wholesale district in Havana. No subsequent infection developed in San José.

From the foregoing it can be seen that the extension of plague in Cuba adhered to railroad transit, and in all points outside of Havana where plague appeared the infection was intimately associated with the importation of San Juan goods, being first observed in each instance in commercial houses receiving such merchandise.

It will be noted that railroad employees engaged in moving this freight escaped infection, but later human cases developed in establishments to which the merchandise was consigned. This circumstance applies to Artemisa, San José, and Santiago, and tends to support the theory that the introducing agent was not loose fleas dispersed from a former infected host, but was an infected rodent or rodents, the infected fleas adhering to the rat until its death at the ultimate destination.

Despite heavy travel to suburbs across the bay from Havana and to many nearby towns there was no evidence of transfer of infection through personal communication.

DIFFUSION OF PLAGUE IN THE CITY OF NEW ORLEANS.

The presence of plague in New Orleans first became known in the last week of June, 1914, when two human

cases were discovered and the diagnosis was bacteriologically confirmed. The last case of human plague occurred October 4, 1914.

When and how plague entered New Orleans is a matter of conjecture. All human cases were indigenous and there is no evidence by which the introduction can be associated with human communication.

Ships arrive at New Orleans from Cuba, Liverpool, and the Canary Islands, all known to have been infected ports at one time or another at comparatively recent dates. The water front conditions of the port are such that rodent infection could be established along the docks and remain there till a rise of the river causes migration inland and across the city.

The first two known cases of human plague acquired infection in the wholesale produce section some three or four blocks from the wharves, being more closely related to the dock where the Havana ships had berth than to any other.

Map 4 shows the progress of the infection, the foci being numbered in sequence without reference to multiple cases at a focus, circles indicating rodent infection and triangles the human infection.

The rodent foci are numbered in sequence, but it is not to be assumed that the infection actually occurred according to this sequence for, as the trapping or finding of a plague rat is largely accidental, doubtless the majority of infected rodents in New Orleans were never discovered. This condition makes for more or less uncertainty of deduction. Take for instance ro-



MAP 4. City of New Orleans, Louisiana, showing location of Human and Rodent Plague Cases, epidemic of 1914-15, according to chronological sequence.

dent foci 59 and 96 in contiguous blocks; the former rat trapped August 28, the latter November 11. As focus 59 was more distantly located from the centrally infected area, the question arises as to whether these two foci were infected at about the same time, focus 96 being undiscovered, or whether an infected rat passed over the intervening territory locating a focus at 59, from which focus 96 subsequently developed.

Rodent foci 16 and 79 is another instance of such confusion. The former focus was discovered July 28, the latter on September 14. Again arises the question as to whether an infected rat passed from the centrally infected area to focus 16, from which focus 79 subsequently resulted, or whether both foci were coexistent, the latter remaining undiscovered by reason of irregular trapping results.

Very early in the campaign it was demonstrated that the entire river front was infected, a plague rat (6) being taken from Dumaine Wharf on July 15, rodent case 13 from Stuyvesant Docks on July 21, and various others at short intervals from intermediate points on the wharves. The distance between rodent case 6 and rodent case 13 is four miles and the diffusion of the infection along this stretch of wharves can be attributed to no factor other than migration of rats.

Between the location of rodent case 1 and that of rodent case 2 (both trapped on the same day, July 12) was a distance of two miles so it is fairly safe to assume that at the commencement of the campaign, July 8, the rodent infection was widely dif-

fused and that the spread of the infection had been progressing for a considerable length of time.

It may be stated that radiating from focus of rodent case 1, human and rodent infection, during July and August, was fairly well confined to the central district of the city or to the sections contiguous to the wharves. Intensive trapping was enforced during these months throughout the city, and it seems safe to assume that the extent of infection was reliably delineated. Elysian Fields Avenue on the east, Claiborne Avenue on the north, Louisiana Avenue on the west and the river were the boundaries of this territory, excepting only the focus at Stuyvesant Docks, on the river and just beyond Louisiana Avenue.

Subsequent to September 1, the infection spread over and beyond these boundaries, plague foci appearing progressively and symmetrically in a radiating zone, to a maximum distance of two miles beyond, rodent case 201 (rodent foci 98) trapped on November 25 being that distance from Claiborne Avenue, the limitation of infection on September 1. Rodent foci 78, 81, 94, and 99 appeared at varying intervals in a sparsely settled district almost a mile from any previously known plague case. Focus 94 was in a residential property, but the other rats were trapped on unbuilt upon land, clearly all cases of plague extension by migration.

A number of similarly isolated rodent plague cases occurred which could be attributed to no other means of extension than that of rodent migration. Infected rat 206 (focus 103)

was caught on November 30, on an open lot, one mile and a half distant from any other known case of rodent or human plague.

Infected rat 236 (focus 110) was trapped on March 3, in a lumber yard one mile distant from any previously discovered focus, and by reference to Map 4 it can be observed that there were numerous instances where rodent plague was discovered separated by varying distances of three to eight blocks from other foci.

While rodent plague was chiefly diffused throughout the city by rodent migration there were two cases apparently transported. Infected rodent 204 (focus 101) was found dead near the Westwego grain elevators across the Mississippi River and opposite the Audubon Park. This rat was found on a dump where the refuse from empty cars was thrown. Railroad cars were sent across from New Orleans for the purpose of being cleaned and it seemed most probable that the rat was transported from the city in one of these empty cars. It was a case of resolving plague, and no subsequent infection developed.

Infected rat 213 (focus 106) was trapped on December 26 near the stockyards in St. Bernard Parish. The location was more than three miles from the nearest focus (focus 74). and the intervening distance was semi-rural in character, a sparsely settled area with wide stretches of vacant lots. Transportation of the rat from New Orleans in a car or in merchandise has to be considered as a possible means of this extension of infection. This also was a case of resolving plague and no

other infected rodents were discovered in this vicinity.

Even to the casual reader an observation of the plague foci indicated on the map of the city of New Orleans will make perfectly apparent the possibilities of plague extension by migratory rodents.

The infection in New Orleans covered sixteen (16) square miles. An average force of 250 trappers was employed, ranging from 320 men during the first few months to 220 after the decline in human and rodent plague. This force was well paid and thoroughly supervised by one foreman to a squad of four or five men and an inspector over the foremen, the number of squads under each inspector varying from five to ten according to the character of territory.

During the first ten weeks the trappers were paid a flat salary of rate \$2.00 per day, but thereafter \$1.75 per day plus a bounty of 10 cents for each rat caught. It is believed that this system resulted in as high a degree of efficiency of trapping and as thorough a rodent survey as would be possible in any city. Notwithstanding this it was perfectly clear that rodent infection would persist in an area for several weeks or months without an infected rat being trapped, despite intensive trapping.

Plague rodent 233 (focus 107) was captured on February 21, beneath a vacant dwelling. Plague rodent 174 (focus 86) had been trapped diagonally across the street on September 26. During this interim of five months no infected rat was captured within a radius of half a mile, so it seems evi-

dent that the infection must have remained in the near vicinity; presumably in a rodent with resolving plague. This illustrates perfectly the fallacy of assuming no infection in an area because of barren trapping results.

While the spread of rodent plague was not wholly uniform the extension from the central and earlier foci had a tendency to adhere to well marked paths of progress. From Esplanade Avenue, rodent foci 84, 65, 79, 16, 38 and a dead rat presumably infected at human focus 19 all appeared along Bourbon Street. In the extension westward the route of travel was along Baronne and Dryades, both streets on which food depots and ramshackle dwellings abound—the natural line of travel for migratory rodents. Extending northward the infection traveled along a belt of territory between Dumaine and Old Basin Canal, foci 60, 64, 80, 97, 105, and 98 appearing successively and in sequence according to the distance from the earlier foci of infection in the area along the river front.

From June to October there were 30 cases of human plague. Cases 1, 2, 3, 4, 5, 7, 10, 12, and 14 all contracted infection in a closely confined area. This district was centrally located and only a few blocks from the wharves. The compactness of this area can be noted by reference to Map 4. These were all solitary cases infected at places of employment and living at a considerable distance therefrom. Table III gives the number of contacts for each case. In no instance was there secondary human cases or subsequent rodent infection at the resi-

dences of these cases. At human focus 5, a residence, Cases 6, 9, and 11 contracted their infection. A history of dead rats on premises prior to onset of symptoms in Case 6 was obtained. No plague rats were taken from this place but one was trapped in an adjoining building.

Cases 15, 16, (focus 12) 19, and 20 (focus 15) contracted infection at their residence, that of Cases 15 and 16 being one block distant from the house of Cases 19 and 20. No infected rats were found on these premises, but a history was obtained to the effect that Case 19 had thrown a dead rat into a garbage can shortly before her illness. One family was negro, the other white, and there was no communication between them.

It was a question as to whether Cases 8 and 22 acquired infection at residence, place of employment or elsewhere, but no secondary cases developed among the contacts.

Cases 13, 17, 18, and 30 contracted infection at place of employment. No secondary cases either rodent or human developed at residences of this group.

Cases 21, 23, 25, and 29 all acquired infection at their residence, either on the premises or nearby. No secondary cases developed among the contacts.

Case 24 (human focus 19) is an interesting example of the obscure circumstances which at times surround the infection of human cases. No plague rats were ever taken on the premises, nor was there any history of dead rats thereon at time of discovery of the case. Subsequent to recovery of the patient it developed that the

TABLE III.
HUMAN PLAGUE CASES IN NEW ORLEANS, 1914-15.

Case No.	Human focus.	Date of illness.*	Source of infection.	Contacts at residence.	Secondary cases among contacts.	Remarks.
1...	1	June 22, 1914	Employment	20	None	{ Lived in same building, but on different floors. Both men worked in an old rat-infested stable near the wharves
2...	1	June 25-26, 1914	Employment	20	None	
3...	2	June 28, 1914	Unknown—water front ?	8	None	
4...	3	July 5, 1914	Employment	2	None	{ Young negro lad. Probably contracted infection at some unknown place. Said to have frequented the wharves
5...	4	July 9, 1914	Employment	3	None	
6...	5	July 16, 1914	Residence	5	None ?	
						Cases 9 and 11 subsequently developed infection. History of dead rats on premises before illness of Case 6. Infected rodent captured on adjoining property
7...	6	July 12, 1914	Employment	10	None	{
8...	7	July 16, 1914	Employment	5	None	
9...	5	July 20, 1914	Residence	5	None	
10...	8	July 21, 1914	Employment	4	None	Note Case 6
11...	5	July 24, 1914	Residence	5	None	{ Note Cases 6 and 9
12...	9	July 23, 1914	Employment	4	None	
13...	10	July 22, 1914	Employment	4	None	
14...	11	July 29, 1914	Employment	1	None	{ Car cleaner in railroad yard from which plague rodent was taken July 28, i. e. day before illness
15...	12	Aug 11, 1914	On premises of residence †	4	None ?	
16...	12	Aug. 7, 1914	Residence †	4	None	
						Cases 15 and 16 occurred on same premises, one block from human foci 10 and 15
17...	13	Aug. 6, 1914	Employment	4	None	{ Sequestered case. Convalescent when discovered. Illness dated back to August 7
18...	14	Aug. 15, 1914	Employment	1	None	
19...	15	Aug. 16, 1914	Environment of residence †	6	None ?	
20...	15	Aug. 17, 1914	Residence †	6	None	{ Infection acquired on the premises of dwelling
21...	16	Aug. 26, 1914	Environment of residence	4	None	
						Note Case 19
						Rear of premises abutted on those of Case 25, but no personal communication between the inmates

* Date on which symptoms were first noticed by patient. Cases are tabulated accordingly as they were bacteriologically confirmed.

† Common source of infection.

TABLE III.

HUMAN PLAGUE CASES IN NEW ORLEANS, 1914-15.—*Concluded.*

Case No.	Human focus.	Date of illness.*	Source of infection.	Contacts at residence.	Secondary cases among contacts.	Remarks.
22...	17	Aug. 26, 1914	Residence ?	6	None	Source of infection untraced. No infected rats on premises
23...	18	Aug. 29, 1914	Environment of residence	1	None	Infected rodent captured August 12 on adjoining property
24...	19	Sept. 1, 1914	Rear yard of residence	6	None	Case, a child of 13 picked up dead rat two days before illness
25...	20	Sept. 1, 1914	Environment of residence	9	None	Note Case 21
26...	21	Sept. 21, 1914	Environment of residence	1	None	Infected rate trapped on adjacent property July 29
27...	22	Sept. 20, 1914	Residence	6	None	Infected rodent captured on succeeding day on adjoining property
28...	23	Sept. 21, 1914	Environment of residence	4	None	
29...	24	Sept. 30, 1914	Environment of residence	3	None	
30...	25	Sept. 30, 1914	Employment ?	10	None	Lived in rat-proof, rat-free building. Infection presumably acquired in vicinity of place of employment

* Date on which symptoms were first noticed by the patient. Cases are tabulated accordingly as they were bacteriologically confirmed.

child had been playing in rear yard two days prior to illness and had picked up a dead rat and cast it into the garbage can.

It can be definitely stated that there was no evidence in New Orleans that plague was transferred from one place to another by human beings, or by fleas in clothing or merchandise.

INTERURBAN SPREAD OF PLAGUE IN LOUISIANA.

Except the plague rodent at Westwego and that in St. Bernard Parish be so considered there was no extension of plague from New Orleans to outside

points. Aside from natural conditions that were unfavorable the system inaugurated for inspection of overland freight, rat-proofing of cars and supervision of loading and dispatch may have been responsible for the non-spread of infection. The car inspection force made report of various rodents found even in empty cars.

The system of loading cars is well known, the car being placed alongside of a platform on the same level as the car floor with an intervening space of a few inches between the platform and car. Aside from the probability of rats in merchandise gaining entrance

to cars there is every opportunity for a rat to run from the warehouse into the open car, especially if the car is left overnight in a partially loaded condition.

In New Orleans as in San Juan it was noticed that shipments of cage rat traps contained several mummified bodies of dead rats. Presumably the rodents had entered the traps while en route from the factory to New Orleans and without food and water had perished.

No importance was attached to the possible spread of plague by means of the traveling public, and consequently no restriction was placed on the movement of people either into or outward from New Orleans. No transmission of infection resulted from such free communication.

PLAGUE IN SAN FRANCISCO.

The first cases of plague in San Francisco in the epidemic of 1907-8 developed near the water front, mainly in the Italian quarter. From this section the infection spread inland across the city progressing in a symmetrical radiating zone.

The writer has not any well recorded epidemiological data and cannot make any definite statement except that diffusion of the infection was similar in character to that in New Orleans. No instances were recorded of transfer of infection by fleas in clothing or in merchandise.

INTERURBAN SPREAD OF PLAGUE IN CALIFORNIA.

Plague infection extended from San Francisco and Oakland to the ground

squirrels in the surrounding territory. The infection became scattered in this way over a widespread area covering many square miles.

Excepting this rural spread of plague the infection extended to only one outside point—Los Angeles, California.

Surgeon A. M. Stimson was ordered there to make a rodent survey and to him the writer is indebted for the information as to the probable manner in which plague was transported to Los Angeles.

In tracing the source of the infection of the one human case of plague in Los Angeles it was ascertained that the patient, a young boy, had picked up a sick ground squirrel, near the railroad yard, shortly before his illness. The squirrel was one of an isolated colony located near the freight yards receiving cars from San Francisco and surrounding territory. A dead squirrel from this vicinity was forwarded to the plague laboratory in San Francisco and examined by Surgeon G. W. McCoy who made the diagnosis of plague.

The squirrel colony was exterminated without bacteriological examination, so that the extent of the infection was not determined. Subsequent to the destruction of the colony no plague was further discovered in Los Angeles.

That a plague rat transported in the cars came in contact with the squirrels either at the site of their burrows, or in the freight yards where they went for grain, seems a most reasonable explanation of the resultant infection in the squirrels.

SUMMARY.

From the foregoing the writer concludes the following:

1. Diffusion of plague infection within a city results, chiefly if not entirely, from migration of infected rodents.

2. The transmission of plague by flea-infested clothing from a human case is a remote contingency.

3. The possibility of transmission of infection by loose fleas in merchandise is evident, but improbable because the habitat of plague-carrying fleas is in and about the burrows of rodents and on their bodies, and when temporarily separated therefrom the natural tendency of these parasites is to regain such habitat.

4. The travel of infection from one community to another is generally accomplished by infected rodents transported in merchandise.

If such conclusion be correct, the eradication of plague is chiefly dependent upon reduction or relative destruction of the rodent population by the various means employed, as

trapping and poisoning, aided and supplemented by rat-proofing, without any considerable attention to human plague incidence or to the movement of the traveling public.

The extension of infection into clean territory can be reasonably prevented by supervision of outbound shipping, deratization of ships (fumigation), rat-proofing of railroad cars, inspection of cargo, requiring it to be from rat-proof wharves or warehouses; or subject to inspection to insure its being rat-free, or fumigated if need be. To these measures additional safety can be secured by restrictions as to loading—ships to be fended off from docks with rat guards on all communicating lines, or to load at anchor by means of lighters, and railroad cars to be permitted to load only during daylight, closed at night if only partially loaded and to receive freight only from rat-proof buildings.



ESTIMATES OF A LIVING WAGE FOR FEMALE WORKERS.

The *American Journal of Sociology* for January gives the following abstract of an article from the *Quarterly Publications of the American Statistical Association*, July, 1915;

Ten American states have recently passed minimum-wage laws. The wording of the statutes of the different states varies but the clear intent in general is that the normal needs of proper living shall be provided the employee. Estimates as to the actual cost of living fall into three groups: those of \$10.00 or more; those less than \$7.00; and those about \$8.50. The estimates below \$7.00 are attempts to get a bare subsistence figure. Miss Bosworth's investigation of the budgets of 450 women workers of Boston shows that women getting less than \$9.00 to \$11.00 per week do not have incomes to meet their expenditures. The women getting \$9.00 to \$11.00 save a few dollars per year, while those getting more than \$11.00 save on an average of \$31.63. Expenditures for food, rent, and health increase as the wage increases to the

\$9.00 to \$11.00 women, when it remains stationary. A study of the *Report of the Massachusetts Commission on Minimum Wage Boards* puts the estimate at \$10.60 per week. The Social Survey Committee of the Consumers' League of Oregon, investigating the schedules of wage earning women of Portland, puts the rate above \$10.00. The estimate of the Massachusetts Brush Workers Board is \$8.28. The board acknowledges this is not a true living wage for it does not provide for any saving or insurance. Studies in St. Louis and Kansas City closely agree; the former giving \$8.53, the latter \$8.50. Investigation in the Twin Cities of Minnesota give \$8.65 to \$8.82. These differences are due to more liberal allowances for education, vacations, insurance, and saving. The provisions of the state minimum-wage laws vary from \$8.25 to \$9.00 per week. Due consideration of the various estimates will lead to the conclusion that \$8.50 is a fair working basis for a minimum-wage scale.

THE LABORATORY IN THE SERVICE OF THE STATE.

PROF. C.-E. A. WINSLOW,
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Address of the Chairman of the Laboratory Section of the American Public Health Association, Rochester, N. Y., September 7, 1915.

Professor Winslow has collected in this paper some very interesting comparative statistics with regard to state health laboratories. The progress of public health laboratories in the United States has indeed been remarkable in the last few years. While we may congratulate ourselves on our advance, it is obvious that in many instances much may yet be done to make the laboratory of greater value to the citizens of the state.

THE public health campaign began in its modern form with the epoch-making discoveries of Pasteur and Lister and Koch and their followers between 1865 and 1885; but the public health laboratory antedates even bacteriology itself. Sanitary chemistry and the physiological aspects of hygiene were studied before the germ theory had been demonstrated. Von Pettenkofer was appointed Professor of Hygiene and Director of the Hygienic Institute at Munich as long ago as 1865; the year in which Pasteur began his first studies of the silkworm disease at Alais and two years before Lister made his epoch-making communications to the *Lancet*.

The history of the early days of sanitary science in America has never been written, but so far as I am aware it was at the Massachusetts Institute of Technology that the systematic study and teaching of modern public health science began on this side of the ocean. The State Board of Health of Massachusetts was established in 1869 and in the next year Professor

Nichols was invited to investigate the sanitary conditions of water supplies by laboratory methods; and he made his first report in September, 1870 the year of the first report of the Rivers Pollution Commission of Great Britain. A more extensive inquiry into the problems of water supply and sewerage was undertaken by him in 1872, this time with the assistance of Ellen Swallow, later to be more widely known as Mrs. Ellen H. Richards. A separate laboratory of sanitary chemistry was established in 1884, in charge of Professor Nichols, with Mrs. Richards as his assistant; and on his death in 1886, Professor Nichols was succeeded by Thomas M. Drown, later president of Lehigh.

William T. Sedgwick, who honors our Association as its president this year, came to the Institute of Technology from Johns Hopkins in 1883 and shortly after published, with Professor Nichols, a treatise on gas-poisoning, which is still a classic on that subject. When the new science of bacteriology came into being in the

* Now, Yale Medical School, New Haven, Conn.

wonderful decade between 1885 and 1895, he was quick to see its possibilities. I have often heard him recall how William Ripley Nichols, the pioneer sanitary chemist, went abroad in the summer of 1886 to study the new methods in use in older universities; and how, after his untimely death, when still in Europe, some tubes of the new Koch gelatin medium were found among his effects and sent over to the Institute. The interest with which this strange material was examined and the hesitation as to its probable use (since the gelatin had become liquefied in transit) are still vivid in the traditions of the Institute of Technology. The new methods were soon mastered, however, and in 1888 the first course in bacteriology at the Institute was offered by Professor Sedgwick.

The time was ripe for the development of public health science in Massachusetts. In 1886, the very year in which the first test tubes arrived from Berlin, the Massachusetts Drainage Commission made a notable report, recommending that the conservation of the inland waters of the state be placed in the hands of a commission. The legislature entrusted this task to the State Board of Health, and in November, 1887, the Board established the Lawrence Experiment Station on the bank of the Merrimac River and began the series of classic studies on the purification of sewage and water, upon which so much of the advance since made in those arts has been based.

The work of the Lawrence Experiment Station grew up in the closest

touch with the laboratories of the Institute of Technology. Mr. Hiram F. Mills, a distinguished hydraulic engineer and member of the Board of Health, organized the investigation, but Professors Drown and Sedgwick were in charge, respectively, of the chemical and biological studies, and students and young graduates like Hazen, Fuller, Jordan and Whipple, who are now eminent in their profession, carried on the detail work.

Nichols' study of the sanitary condition of the Massachusetts water supplies in 1870 was then, so far as I am aware, the first application on a large scale of laboratory methods to the public health service in the United States. The public health laboratory in the modern sense of a laboratory, independently supported by a city or state, aiding in the routine solution of its sanitary problems, was a later growth and dates from the sudden rush of the new knowledge of bacteriology into this country in 1887 and the next succeeding years. It is difficult to assign priority to any particular state or city or university at this time, for the seed was sprouting on every hand. It was in November, 1887, that the Lawrence Experiment Station of the Massachusetts State Board of Health was established. In the same winter of 1887-88, the state of Michigan opened a hygienic laboratory at Ann Arbor; and in 1888, Dr. Gardner T. Swarts founded what is said to have been the first municipal public health laboratory in this country at Providence.

The early work of the Massachusetts State Board of Health and of Dr.

Swarts at Providence was largely devoted to the sanitary rather than to the more medical aspects of the subject. It was becoming increasingly clear, however, that the advances which had been made during the preceding decade in the bacteriological laboratories of Europe held rich promise of usefulness in the direct control of communicable disease. In 1892 the epidemic of cholera at Hamburg was at its height and a number of ships from that port were detained in New York Harbor. Dr. Hermann M. Biggs, of the City Department of Health, suggested the application of the new bacteriological methods for the detection of cholera cases among the immigrants and was fortunate enough to secure the services of Dr. E. K. Dunham, a young pathologist, just returned from the study of the methods in use in Hamburg. In this year, then, 1892, a Division of Bacteriology and Disinfection was established in the Department, and in the next year Dr. W. H. Park began his connection with the laboratories of which he is now the head, by introducing the then new methods for the bacteriological diagnosis of diphtheria. In 1894 the examination of the sputum of suspected cases of tuberculosis was begun and an appropriation was made for the manufacture of diphtheria antitoxin, then being produced in a small way by Behring and Aronson in Germany and by Roux in Paris.

The laboratory established by Doctor Biggs was probably the first municipal bacteriological laboratory in this country devoted primarily to diagnostic work, and perhaps even

the first of this kind in the world. Doctor Park, who as a young medical graduate began to examine throats for the diphtheria bacillus as a bit of private research work in 1893, now has 250 people under his direction and over 75,000 diphtheria cultures are examined in his laboratory each year.

The treatment with antitoxin, which was first offered free to the citizens of New York twenty years ago, has reduced the diphtheria death-rate in New York City from over 15 per 10,000 to less than 2.5, which represents a saving of some 20,000 lives. Today the New York City Department of Health not only prepares and distributes antitoxic sera for diphtheria, but for tetanus, meningitis, streptococcus, and pneumococcus infections, as well as vaccines for smallpox, rabies and other bacterial diseases.

It has seemed to me that it might be of interest in opening the meetings of the Laboratory Section this year to review very briefly the present status of the public health laboratory in the service of the State Departments of Health; to see how general the development of such work has been in the past two decades and to consider some of the more pressing problems which confront the state laboratory in the immediate future. I therefore sent out last spring a brief and simple questionnaire to the secretaries of all of the State Departments of Health in the United States, asking for information in regard to the appropriations available for laboratory purposes and the kinds of work actually performed in the year 1914 by the

respective states. I was fortunate in obtaining fairly complete returns (except in regard to appropriations) from every state except Oklahoma, and I wish at this time to express my appreciation of the courtesy of the officials concerned in so cordially responding to my request.

The results of this questionnaire are set forth in Table I. No attempt was made to determine the amount of work actually accomplished, which under certain items and in certain states was undoubtedly extremely small. The data obtained represents merely the statement that the department in question was prepared to make and did actually make examinations or analyses, or did actually prepare sera or vaccines of the kind specified.

The main work of either the state or the city public health laboratory may conveniently be grouped under five headings: Diagnosis, Preparation of Sera and Vaccines, Examination of Water and Sewage, Examination of Foods and Drugs, and Examination of Milk, and the results of the questionnaire will be considered under these heads.

The facilities for the laboratory diagnosis of disease appear on the face of these returns to be unexpectedly good. Examinations for diphtheria, tuberculosis and typhoid fever are practically universal, all but two states of the forty-seven reporting (these two being New Mexico and Wyoming) stating that they make the laboratory diagnosis for diphtheria and typhoid fever, while all but Colorado, New Mexico and Wyoming diagnose tuberculosis. Malaria follows close, with

41 making the examination, the exceptions for the most part being northern states where this disease is rare. It is gratifying, too, to find that 37 of the 47 states report examinations for rabies as part of their routine.

Most surprising of all is the fact that 36 of the 47 states report the diagnosis of gonorrhœa and 27 that of syphilis. Unfortunately, the question was stated in the above form and did not specify the Wassermann reaction, and I have reason to believe that in a number of instances only a microscopic examination for spirochætes is relied upon. It is distinctly encouraging, however, to find that over half of the states of the Union have state laboratory facilities of some sort for the diagnosis of venereal diseases. The development of such facilities is perhaps the most pressing task of the moment for those states and cities which have not as yet provided readily available laboratory diagnosis which is the first step to be taken in gaining that knowledge of the actual prevalence of venereal disease which is a prerequisite to its successful control.

Thirty of the states report examinations for glanders and 19 for cancer or tumors in general, a charge being made for the latter examinations in a number of states, as is the case with the Wassermann test in some instances.

One of the letters received in reply to my circular enclosed a copy of the Mississippi *Health Bulletin*, containing a digest of a very similar questionnaire sent out a year ago by Dr. C. R. Stingily and covering the year 1913. Doctor Stingily received returns from

32 states, of which 29 reported diagnostic examinations for tuberculosis, 28 for typhoid, 27 for diphtheria, 19 for malaria, 18 for rabies and 18 for gonorrhœa. Nine states were making Wassermann examinations while examinations for anthrax were reported by 9 and for intestinal parasites by 13. Eleven states listed urine analysis among their activities, 9 meningitis diagnosis, 9 tissue examination, 7 blood examination and 5 gastric analysis.

If the progress of diagnostic work in the state laboratories seems rapid and encouraging, developments in the line of preparing prophylactic and curative sera and vaccines are much more modest. Typhoid vaccine seems to be the only preparation of this kind commonly made in the state laboratories; 19 out of the 47 states reporting its manufacture. It is of interest to note that in 1913 only 12 out of 32 states reported to Doctor Stingily that they were making typhoid vaccine. Ten states report the occasional manufacture of other special vaccines, 7 of anti-rabic virus and 3 of tuberculin. It is somewhat surprising to find that only five states (Georgia, Illinois, Massachusetts, New York and North Dakota) prepare diphtheria antitoxin, while only one (New York) makes tetanus antitoxin and only one (Massachusetts) smallpox vaccine.

Of course it is not important that a state or city should manufacture its own vaccines and sera if a reliable product can be more cheaply obtained from commercial firms or from other public laboratories, as will generally be the case in small communities.

What is exceedingly important is that these prophylactic and therapeutic agents should be distributed with the utmost freedom; and this is rarely done where the vaccines or sera must be purchased as they are used. Aside from the four states which report the manufacture of diphtheria antitoxin, five others (Illinois, Kansas, Kentucky, North Carolina and Virginia) report its distribution either "free to the indigent" or "at cost," except in Illinois where it is apparently distributed free to all.

A change in administrative procedure in New York City has recently furnished a striking object lesson in the importance of stimulating by every possible means the use of vaccines and sera, if the best results are to be secured. From 1895 until 1913 not only was diphtheria antitoxin distributed free in New York City, but Department inspectors administered it and performed intubation when requested by the attending physician at the home of the patient and without charge. The death-rate from diphtheria fell from 15.9 per 10,000 in 1894, to 2.2 in 1912.

On February 1, 1913, free administration of antitoxin and free intubation in homes were discontinued in the belief that the education of the medical profession and the general public had proceeded far enough to warrant such a course. The actual number of deaths from diphtheria in New York City, irrespective of the growing population, was steadily falling prior to 1913. It was 1,715 in 1910, 1,284 in 1911 and 1,126 in 1912. Free administration of antitoxin ceased February

1, 1913 and the number of deaths from diphtheria rose from 1,126 in 1912 to 1,334 in 1913 and 1,492 in 1914.

There are some 20,000 deaths each year in the United States from this easily preventable disease. Free administration of antitoxin is, of course, out of the question except in cities, but I believe that both state and city departments of health have no more important duty and no more important opportunity than to manufacture or purchase diphtheria antitoxin, distribute it freely without question of indigence and advertise and organize its distribution with all the powers at their disposal.

The sanitary examination of water supplies and the study of stream pollution, as noted above, was historically the first function of the public health laboratories in Massachusetts, as in England and in Germany, antedating the very science of bacteriology itself. Thirty-six of the 47 states report that chemical examinations of water are made while 44 report bacteriological examinations. In Illinois such examinations are made by the State Water Survey, independent of the Department of Health.

Doctor Stingily, in his 1913 questionnaire, states that 28 out of 32 laboratories reporting made bacteriological examinations and 22 made chemical examinations.

The tendency in recent years has been to lay increasing stress on the bacteriological rather than the chemical examination of water, but the fact that an appreciable number of states are not equipped for chemical analysis is probably often due to the

fact that their bacteriologists are medical men without training in sanitary chemistry, more than to any settled policy. Chemical examinations are in many cases essential to a sound interpretation of results and should certainly be provided for in the budget of all state laboratories.

There is no doubt that a great deal of time and money has been wasted in the past in sanitary examinations of water, conducted on a stereotyped plan and without the essential information obtained by sanitary inspection. It cannot, I think, be denied that a great part of the data obtained by a complete chemical sanitary analysis has been accumulated on a purely routine plan and without any practical interpretation being contemplated or obtained.

It is of course true that the sanitary analysis, and particularly the bacteriological examination, of a sample of water may often yield information of definite value even without a sanitary inspection. The number of colon bacilli present, for example, is always a fact of real significance. Yet the value of the laboratory examination is so greatly enhanced by a knowledge of the physical conditions of the gathering ground and the particular possible sources of pollution that it would probably be better policy to work out a plan for such inspections rather than to increase the number of laboratory examinations of water from unsuspected sources.

The difficulties in the way of securing adequate sanitary inspections are of course considerable. In Doctor Stingily's review he states that Nevada

and Utah only examine samples collected by state department inspectors; Alabama, Massachusetts, Montana, New Hampshire, New York, Oklahoma and Wyoming require samples to be collected by health officers, and Nebraska and North Carolina by physicians.

Dr. A. B. Wadsworth, Director of the Division of Laboratories and Research of the New York State Department of Health, has, during the past year, perfected a workable and reasonably effective plan for meeting this important need. All samples for examination must be collected by state sanitary supervisors, state department engineers or local health officers, and in every case the officer in question must fill out a very detailed inspection card. Different forms of inspection cards are provided for ground waters, untreated surface waters and treated surface waters, and in the circular of instructions it is emphasized that:

"The laboratory examination determines the presence or absence of pollution at the time of the sampling.

"The field inspection determines the sources and the nature of the pollution and thus the significance of its presence or absence."

If such data were available, it would be feasible and I believe desirable to depart from the stereotyped routine of chemical water analysis by omitting all determinations not likely to prove of definite significance in connection with the sample in hand. In ordinary cases, where merely an opinion as to the potability of a water is desired, I am inclined to think that determinations of total residues and nitrates and

nitrites in a surface water and of all the chemical data except nitrates, nitrites and chlorin in a ground water, might be omitted without serious loss. Such data are of interest but they are far less valuable to the community than would be a larger series of samples which had been subjected only to the most important tests.

The laboratory examination of milk is a much newer problem. Twenty-six of the laboratories report that chemical examinations of milk are made while 30 of them carry out bacteriological examinations. In many instances the work along this line is very limited in scope. Thus Minnesota examines only certified milk and Nebraska only human milk, while Oregon and Washington, which report the number of their examinations, made only 39 and 6 bacteriological examinations of milk, respectively. In nine other states than those listed under this column in Table I, either chemical or bacteriological examinations of milk are made by some branch of the state government other than the department of health.

The routine bacteriological examination of milk offers, of course, peculiar difficulties to the state laboratory on account of the changes in content which would necessarily occur if samples were shipped from considerable distances, and on account of the enormous volume of work which must be done if it is to be undertaken on any general scale. Yet the practice of grading milk supplies according to their bacterial content is growing more general year by year and the control of the operation of pasteurizing

plants by bacterial examinations is becoming more and more essential. Most of the burden of such work will naturally fall on the cities, rather than on the states, but it is likely that the states will also be called upon to do their share. The difficult problems involved may be solved by the establishment of local branch laboratories (Florida now has five such laboratories) perhaps with special part time men employed for the purpose, or by the perfection of the microscopic counting method which would make it possible to have samples collected by local health officers spread and dried on the slide and shipped to the central laboratory as is done with Widal specimens today.

Chemical examinations of foods and drugs are reported by only 20 of the 47 laboratories and bacteriological examinations by 24 of them. In 12 other states the information was volunteered that a special laboratory was maintained for this purpose by some other department of the state government, usually by a special food and drug department, by a state chemist or by the Department of Agriculture.

The examination of foods and drugs should certainly be provided for in some department of the state government but it is still somewhat of an open question whether it is wisely connected with the Department of Health. As the work is carried on today it is mainly a question of maintaining standards of commercial honesty, since the ordinary problems of adulteration, misbranding and the use of preservatives have but little bearing

on health. If these questions alone were to occupy the attention of the food and drug laboratory it would probably be better to keep the work separate from that of the health department. Now that public health workers are beginning to recognize that the education of the public in matters of personal hygiene is one of their important functions, there may, however, be distinct advantages in keeping food and drug examinations under health department control. If the laboratory were used for the analysis of foods for their calorific value and for the dissemination of information as to model dietaries based thereon, a real public service could be performed. The State Laboratory of Vermont has already done pioneer work along this line.

The subject of air examination was omitted from my questionnaire because so few state departments have as yet begun work in this field. In the future, however, it is probable that increasing demands will be made along this line. In schoolhouses and public buildings and perhaps in other places, the health department of the future is likely to be called upon to make temperature records and determinations of carbon dioxide, perhaps in some cases of dust and bacteria as well. New Jersey and Indiana, at least, have already conducted special investigations of this kind.

Finally we come to the question of original investigation—which reveals one of the most serious shortcomings of the public health laboratory as at present constituted.

Twenty of the forty-seven reporting

laboratories state that studies of technical methods, special investigations or research of some sort was carried on during 1914; and a list of the subjects investigated may be of interest as indicating the scope and importance of such work. California makes special mention of studies relating to the transmission of poliomyelitis, the control of carriers, the epidemiology of rabies and the nutritive value and analysis of foods; Florida mentions a water survey of the state and studies on rabies and on the bacterial flora of soda fountain glasses; Georgia epidemiological studies; Idaho researches on Rocky Mountain Spotted Fever; Iowa, investigations on rabies, typhoid fever and vaccines; Kansas, studies of spoiled canned goods; Louisiana, researches on rat plague; Massachusetts, food and drug analysis; Michigan, studies of fumigation and disinfection, of water purification and of problems relating to diphtheria and tuberculosis; Montana, sewage disposal investigations; New Jersey, separation and identification of narcotic drugs, analysis of flavoring extracts, disposal of cannery and creamery wastes and effect of floating on hibernation of oysters; North Dakota, studies on water and sewage and milk, on amebic dysentery, on cancers and other tumors; Ohio, methods of water and sewage treatment and problems connected with the control of diphtheria and poliomyelitis; Pennsylvania, epidemiological studies; Rhode Island, researches on water analysis and water purification; West Virginia, hookworm studies.

This list of subjects mentioned by a

few of the laboratories which do carry on research work indicates how much there is to be done. It seems distinctly unfortunate therefore that 27 out of the 47 reporting laboratories confine themselves solely to routine. Not only does each laboratory owe it to its fellows to help in the task of discovering and systematizing and applying in practical form the body of scientific truth upon which laboratory science rests, but it also owes it to its own workers to keep them intellectually alive by contact with new truth and instinct with the vital spirit of the scientific pioneer.

All these important services of the laboratory cost money, and before closing, we must pause for a moment to see what appropriations are available for the branch of the state service, in which, as members of this section, we are most keenly interested.

Thirty-five of the forty-seven reporting states gave definite information in regard to their 1914 budgets and the results are shown in Table I, and in more compact form in Tables II and III. The actual appropriations for laboratory purposes in these thirty-five states ranged from \$2,500 in Missouri and Tennessee, to \$39,000 in California, \$47,865 in New York and \$56,800 in Massachusetts. As indicated in Table II, nearly half of the state appropriations fall between \$5,000 and \$10,000. Doctor Stingily in 1913 reports an average of \$7,975 spent for laboratory work in the states he studied, which amounted to about one-seventh of the total appropriation for all health purposes.

TABLE I.
ACTIVITIES OF STATE HEALTH DEPARTMENT LABORATORIES IN 1914.

State.	Laboratory budget.		Diagnostic tests for										Manufacture of antitoxin for		Vaccines for				Examinations of				Examinations of foods and drugs.		Special Investigations. Technical studies of methods and re-search.	
	Total.	Per capita.	Diphtheria.	Tuberculosis.	Malaria.	Typhoid fever.	Gonorrhea.	Syphilis.	Glanders.	Rabies.	Cancer.	Diphtheria.	Tetanus.	Typhoid fever.	Smallpox.	Rabies.	Tuberculosis.	Other diseases.	Water and sewage.		Milk.		Chem.	Bact.		
																			Chem.	Bact.	Chem.	Bact.				
Alabama.....	\$10,000	.004	+	+	+	+	+	+	+	+	+	+			+					+	+	+	+	+	+	+
Arizona.....	4,800	.02	+	+	+	+	+	+	+	+	+	+														
Arkansas.....			+	+	+	+	+	+	+	+	+	+														
California.....	39,000	.014	+	+	+	+	+	+	+	+	+	+														
Colorado.....	2,600	.003	+	+	+	+	+	+	+	+	+	+														
Connecticut.....	9,000	.008	+	+	+	+	+	+	+	+	+	+														
Delaware.....	3,500	.018	+	+	+	+	+	+	+	+	+	+														
Florida.....	30,324	.030	+	+	+	+	+	+	+	+	+	+														
Georgia.....	30,500	.011	+	+	+	+	+	+	+	+	+	+														
Idaho.....		.0008	+	+	+	+	+	+	+	+	+	+														
Illinois.....	4,400	.0008	+	+	+	+	+	+	+	+	+	+														
Indiana.....	35,000	.013	+	+	+	+	+	+	+	+	+	+														
Iowa.....	6,000	.003	+	+	+	+	+	+	+	+	+	+														
Kansas.....			+	+	+	+	+	+	+	+	+	+														
Kentucky.....			+	+	+	+	+	+	+	+	+	+														
Louisiana.....			+	+	+	+	+	+	+	+	+	+														
Maine.....	5,500	.007	+	+	+	+	+	+	+	+	+	+														
Maryland.....	17,000	.013	+	+	+	+	+	+	+	+	+	+														
Massachusetts.....	56,800	.016	+	+	+	+	+	+	+	+	+	+														
Michigan.....	5,000	.002	+	+	+	+	+	+	+	+	+	+														
Minnesota.....	19,200	.009	+	+	+	+	+	+	+	+	+	+														
Missouri.....	3,300	.002	+	+	+	+	+	+	+	+	+	+														
Mississippi.....	2,500	.0007	+	+	+	+	+	+	+	+	+	+														
Montana.....	4,000	.011	+	+	+	+	+	+	+	+	+	+														
Nebraska.....	12,000	.01	+	+	+	+	+	+	+	+	+	+														
Nevada.....	5,000	.051	+	+	+	+	+	+	+	+	+	+														
New Hampshire.....	6,400	.014	+	+	+	+	+	+	+	+	+	+														
New Jersey.....	20,300	.008	+	+	+	+	+	+	+	+	+	+														
New Mexico.....		No Laboratory	+	+	+	+	+	+	+	+	+	+														
New York.....	47,825	.005	+	+	+	+	+	+	+	+	+	+														
North Carolina.....	14,000	.006	+	+	+	+	+	+	+	+	+	+														
North Dakota.....	10,000	.015	+	+	+	+	+	+	+	+	+	+														
Ohio.....	16,700	.003	+	+	+	+	+	+	+	+	+	+														
Oklahoma.....			+	+	+	+	+	+	+	+	+	+														
Oregon.....	5,000	.006	+	+	+	+	+	+	+	+	+	+														
Pennsylvania.....			+	+	+	+	+	+	+	+	+	+														
Rhode Island.....	9,000	.02	+	+	+	+	+	+	+	+	+	+														
South Carolina.....	5,500	.004	+	+	+	+	+	+	+	+	+	+														
South Dakota.....			+	+	+	+	+	+	+	+	+	+														
Tennessee.....	2,500	.001	+	+	+	+	+	+	+	+	+	+														
Texas.....			+	+	+	+	+	+	+	+	+	+														
Vermont.....	16,200	.05	+	+	+	+	+	+	+	+	+	+														
Virginia.....	6,000	.003	+	+	+	+	+	+	+	+	+	+														
Washington.....			+	+	+	+	+	+	+	+	+	+														
West Virginia.....	7,000	.005	+	+	+	+	+	+	+	+	+	+														
Wisconsin.....	8,000	.003	+	+	+	+	+	+	+	+	+	+														
Wyoming.....			+	+	+	+	+	+	+	+	+	+														

TABLE II.

TOTAL APPROPRIATIONS OF VARIOUS STATES
FOR PUBLIC HEALTH LABORATORY WORK
IN 1914.

\$2,500- \$5,000.	\$5,000- \$10,000.	\$10,000- \$15,000.	\$15,000- \$20,000.
Ariz. Col. Del. *Ill. Miss. *Mo. Mont. Tenn.	*Ala. *Conn. Iowa Me. Mich. N. H. Nev. Oregon R. I. S. C. *Va. Wis. W. Va.	*Neb. N. C. N. D.	*Md. Minn. Ohio Vt.
\$20,000- \$25,000.	\$30,000- \$35,000.	\$35,000- \$40,000.	Over \$40,000.
N. J.	Fla. *Ga.	Cal. Ind.	Mass. N. Y.

*Food and drug work carried on in another laboratory.

Table III, showing the per capita appropriations, is more significant and reveals the fact that 20 out of 35 states spend less than one cent per inhabitant per year for the maintenance of their public health laboratory, while 3 states spend over two cents (Florida, 3.6 cents, Nevada 5.1 cents, Vermont 5 cents). There are several of the states in the first group (Minnesota and New Jersey come at once to mind) which are noted for the splendid service their laboratories are rendering in spite of financial handicaps. In

general, however, an appropriation of between one and two cents per capita, amounting to about one fifth of the total appropriation for state public health work, will be required in order to ensure efficient laboratory service.

The work of the public health official has been summed up in a formula by saying that *he applies the lessons learned in the laboratory to the health of the community at large*; and this is why the division of laboratories which keeps him in touch with scientific fact on the one side and the division of public health education which reaches the people on the other side, are becoming

TABLE III.

PER CAPITA APPROPRIATIONS OF VARIOUS
STATES FOR PUBLIC HEALTH LABORATORY
WORK IN 1914.

.07-.09 cents.	.1-.9 cents.	1-2 cents.	3-4 cents.	5-6 cents.
*Ill. *Mo.	*Ala. Col. *Conn. Iowa Me. Mich. Minn. Miss. N. J. N. Y. N. C. O. Ore. S. C. *Va. W. Va. Wis. Tenn.	Ariz. Cal. Del. *Ga. Ind. Md. Mass. Mont. *Neb. N. H. N. D. R. I.	Fla.	Nev. Vt.

*Food and drug work carried on in another laboratory.

so increasingly important year by year. The formula is only a partial one since it ignores the equally important sources of knowledge furnished by the statistician, the engineer and the epidemiologist. The work of the laboratory is at least, however, *one* of the chief foundations upon which all sound public health work must be based. Its functions are growing and multiplying, the character of its work is

becoming more exact and rigorous, its problems of research more taxing and more numerous. As members of this Laboratory Section, we must see that the public understands what the public health laboratory can accomplish both in city and in state. We must ask insistently for the funds needed for its fundamental work; and so soon as the facts are understood we shall obtain the support we need.



TUBERCULOSIS IN CLOTHING TRADES.

In a medical examination of 3,000 workers in the garment trades of New York City, the United States Public Health Service announces that tuberculosis is undoubtedly the most important disease. Among males, the rate of prevalence of this disease was found to be ten times that in the United States Army, and among females, three times.

The investigation was carried on in coöperation with the Joint Board of Sanitary Control of the Cloak and Suit trades, and all of those examined submitted voluntarily to the tests.

As a result, it was determined that but few individuals (only about 2 per cent. of the total number examined) were free from defect or disease. There were recorded 13,457 defects of all kinds, of which 9,451 were in males and 3,916 in females. Not all of these were serious.

The examination showed no vocational diseases peculiar to the garment trades. Nevertheless, these sedentary industries were shown to intensify the bad effects upon health and efficiency of certain defects and diseases or to produce them in predisposed individuals.

As is usual, in the case of tuberculosis, the disease was found most prevalent among the lowest paid class of garment workers, namely,

pressers and finishers, and particularly among males.

Factors influencing the greater prevalence among males seemed to be their apparent greater age, the long average period of occupation in the garment trades, the high percentage of males, as compared to females, with families dependent upon them, thus leading to self-denial on the part of the bread winner in the matter of food and clothing, and finally the element of over-speeding in the busy season (especially operative for piece workers in their endeavor to earn higher wages during the busy season, to tide themselves and families over the slack summer and winter season).

Apart from tuberculosis, the most common defects and diseases among garment workers were, in order of frequency for both sexes, defective vision, 69 per cent.; faulty posture, 50 per cent.; of males, chronic nose and throat affections, 26.2 per cent.; defective teeth, 26 per cent.; weak and flat feet, 26 per cent.; chronic constipation, 23.7 per cent.; hypertrophied tonsils, 15.3 per cent.; defective hearing, 10 per cent.; nervous affections, 7.75 per cent.—*Journal of Outdoor Life, February.*

THE CONTROL OF SCARLET FEVER.

A. J. CHESLEY, M. D.,

Director, Division of Preventable Diseases, Minnesota State Board of Health.

Read before a General Session of the American Public Health Association, Rochester, N. Y., September 8, 1915.

Doctor Chesley has worked out with great care and detail a system which works very well in Minnesota. His paper explains that system and tells exactly how it was applied in one epidemic.

THE United States Public Health Service heads its morbidity reports with this statement of fact:

"No health department, state or local, can effectively prevent or control disease without a knowledge of when, where, and under what conditions cases are occurring."

No health department can control scarlet fever without this knowledge, nor even with it, unless the persons exposed to scarlet fever infection are followed up and supervised for five or six days after last exposure. If this is not done the new foci of infection resulting will each have its group of exposed persons, some of whom will become spreaders of infection to other groups, and so on.

It may be taken for granted that in every outbreak there are mild, unrecognized cases and recognized, or at least suspected, cases deliberately concealed by families concerned or not reported by physicians. To find these cases the clues elicited by epidemiological investigation of reported cases are very valuable, but usually insufficient. The spread of scarlet fever is dependent upon the amount of nose and throat discharges

thrown out and the intimacy, and duration and frequency of exposure as well as by the number of persons exposed and the proportion of susceptibles among them. The short incubation period, 1 to 6 days, usually less than 4, necessitates early apprehension of infectious persons before too widespread exposure occurs. Therefore, every opportunity for examination of groups of children, for signs of scarlet fever, mild, atypical, recovered or beginning, and every means which will assist in obtaining information about that part of the population most likely to develop scarlet fever, should be utilized.

In no way can so much valuable information be obtained in as short a time as through inspection of children in school for suspicious signs. Such inspection, the follow-up of absentees, tracing of exposed persons and the sources of infection is facilitated by a card index, termed, in Minnesota, "A Disease Census of School Children," which was developed and first applied by the writer in an epidemic at Rushford, Minn., January, 1911. The teacher enters on the face of a card for each pupil:

1. Family name.
2. Given name in full.
3. Address while attending school in Minnesota.
4. Home address (by sanitary sub-division, *i.e.*, township, village, city).
County. State.
5. Date of birth.
6. Place of birth.
7. Dates of residence outside of state.

The teacher enters on the other side, sex, age, school and grade, and date of record, arranged so as to make a classification by sex or age very easy. The remainder of the card is filled out by the student's mother, or by the person who cared for student during childhood, who enters after each disease the student has had, his age when the illness occurred. The list is as follows:

Chickenpox	Rheumatism
Diphtheria	Scarlet Fever
German Measles	Smallpox
Infantile Paralysis	Tonsilitis
Measles	Tuberculosis
Mumps	Typhoid Fever
Pneumonia	Whooping Cough
Vaccinated	

Allowing for mistakes in diagnoses, the information given by the mother is likely to be more complete and accurate than could be obtained from physicians or any other sources. Such information obtained when there is no epidemic, is far more reliable and complete than when obtained in the excitement and confusion of an epidemic.

The teachers keep the cards up to date. When an absentee has had one of the listed diseases, his teacher makes the proper entry on his card upon his return to school. She inquires about sickness during vacation and makes necessary entries. If a pupil moves or is promoted, his card is transferred with him.

In a school inspection, each pupil carries his card. If he shows suspicious signs, the doctor keeps the card. The cards of all who show no suspicious signs are returned to the teacher and filed alphabetically.

The cards are kept in the schools, and from them summary sheets are made out by the teachers and sent to the state health department for statistical study and for reference. The summary gives the total number of pupils enrolled in each school; how many of each sex have had scarlet fever (*etc.*), and when; the number of pupils who are not residents of the sanitary district in which the school is located and their home sanitary districts.

Another form of card is used for school population index. The location of each rural school, the number of pupils enrolled in the age groups 5 to 8, 8 to 15, and 15 to 21, taken from the reports of the county and state superintendents of schools, is entered on these cards, which constitute, when filed by counties, a school population index for the state and show which local board of health is concerned when any school is affected. The names of teachers in rural schools and of principals or superintendents in villages and cities and their home addresses are included if obtainable. School data should be secured for parochial as well as public schools. In parochial schools it is important to know the denomination, the number of dormitory students and the facts in regard to non-residents.

A district health officer or state epidemiologist should have the most

detailed maps obtainable. County maps, railroad, rural-route and road maps are always available and many township maps and city and village plats can be had. Other useful reference data may be obtained from the State Department of Education, Labor Bureau, Dairy Commission, certain county officers' records and the United States Census. The latter shows the general composition, character and distribution of the population. The number and location of places of assemblage such as town halls, churches, libraries, creameries and certain other industries to be found in rural districts is of importance, for wherever people assemble, disease may be spread. Visiting nurses' associations or dispensaries may be able to furnish other additional information of a specific nature.

In routine epidemiological work in Minnesota all of the above mentioned references are in daily use and seem indispensable. The utility of the Disease Census and the other references described has been demonstrated in many epidemics in Minnesota during the past four and a half years.

The state epidemiologist or the district health officer can form a working plan for a given outbreak before he leaves his office by studying the maps, the school population index, the disease-census summary, the morbidity reports and other data relating to the territory concerned. The school population includes certain age groups only, but the probable number of children under school age can be estimated by using the U. S. Census figures showing what per cent. of the

general population each age group comprises.

However, if these aids to the rapid follow-up of exposed persons and detection of foci of infection are not available, the work can be done successfully in spite of the difficulties. An actual experience in the early days of epidemiological work in Minnesota illustrates this fact:

March 1, 1911, a letter from a physician in "A" to the executive officer of the State Board of Health, stated: "Scarlet fever is epidemic in our city. Please investigate. Don't use my name."

The files of the State Board of Health contained no scarlet fever reports from "A". An epidemiologist was given this order:

"Investigate scarlet fever at "A". No cases reported. See Dr. "X," health officer."

According to the railway guide, the city of "A" was distant 300 miles and had a population of about 5000. Armed with this information only, the epidemiologist reached "A" at noon Thursday, March 2. By evening he had met the health officer, the superintendent of schools and all local physicians. After the discussion of the situation with them, he concluded that a mild, widespread epidemic of scarlet fever existed within and outside of the city, chiefly among children of school age, with no fatalities and with but few severe cases which were attended by physicians and which, alone, had been reported and quarantined. The health officer, in common with other physicians, questioned whether the epidemic was

mild scarlet fever or only German measles. The superintendent of schools stated that 1,068 pupils were enrolled under 26 teachers in 4 schools; that the number of pupils absent on account of illness was unusually large; that he had excluded pupils who returned to school while desquamating, and knew of suspected cases never investigated by a physician.

The evening was spent in preparation of a sufficient number of sheets for entry of specific information, to be obtained by inspecting pupils and teachers, and of specimen cards for each teacher, showing what extra data were required for non-resident pupils and for absentees. Non-residents were to be classified in three groups according to the time they spent at home:

Group A. Those who went home every night;.

Group B. Those who went home week-ends;

Group C. Those who went home vacations only.

Names of close associates of absentees were to be entered on absentees' cards as well as date of first absence, and known or supposed reason for absence.

It was necessary to complete the inspection and apprehend suspects among non-resident groups "A" and "B" on Friday, since no school was to be held Saturday. Inspection was conducted as follows:

The superintendent announced briefly the purpose of the investigation; detailed teachers to enter data on sheets and cards; directed pupils

seated at attention to face to the right, stand, pass to rear of the room and approach the inspector in single file. The inspector, standing beside a well-lighted window, estimated at a glance the physical condition of each pupil; carefully examined the mouth, throat, tongue, neck, ears, hands and wrists for suspicious signs; gave each pupil presenting such signs a slip of paper. Neither teachers nor pupils knew the significance of this slip of paper.

The teacher entered on her sheet, pupil's name, sex, age, parent's initials or guardian's name; noted whether pupil had had scarlet fever and, if so, what month and year, and marked "X" opposite the name of each pupil who had been given a slip of paper. Home addresses by sanitary district, *i. e.*, township, village, city, and postoffice address, were entered in addition for non-residents.

There were 59 non-resident pupils from 10 counties, 57 of whom came from 23 townships and 7 cities or villages in Minnesota and 2 came from 2 neighboring states. Had the schools closed and these non-residents been sent home after exposure to scarlet fever, infection might have been spread to remote districts.

Inspection of 909 pupils and teachers was completed at 4.10 p. m. Inspection of a room averaging 35 pupils required about ten minutes. Collection of data required about thirty minutes per room.

Cards were first filed alphabetically and studied. The value of this procedure in tracing the relation between pupils who had had scarlet

fever recently and suspects and absentees is shown as follows:

Stella A., 6, 1st grade, Central School, absent; Gladys A., 9, 2d grade, Central School, "suspect"; Pearl A., 11, 3d grade, Central School, "suspect". This suggested that Stella A.'s absence was probably due to scarlet fever. Again, Mary S., 16, High School, absent; home in Wisconsin; boards at W.'s. Her card shows that Gertrude G. and Emma R. are her particular chums. Picking out their cards Gertrude G. was found to be a "suspect," while Emma R. showed no suspicious signs, but had had scarlet fever one year before. Upon consulting the superintendent, he stated that Mary S. was taken ill March 1 at school. Visiting Mary S. with family physician, she was found to have scarlet fever and Gertrude G., her chum, was at once isolated on account of having a suspicious sore throat and of having associated with Mary S.

The school inspection data indicated that about 20 per cent. of the pupils were immune to scarlet fever; that some active, unreported cases would be found in investigating probable sources of infection for known cases; that some mild, unrecognized or concealed cases would be found in following up persons exposed to known cases and in families of pupils absent for unknown reasons.

To ascertain what cases had been quarantined and what physician usually attended each family, the data for the 41 cases which had occurred during the previous six months and the 89 suspects and 185 absentees of

March 3 were discussed with the health officer and facts noted on cards. Further information was secured from the family physicians' records or memory. All doubt on the part of the health officer and physicians as to diagnosis was dispelled by this discussion, for recognized cases of scarlet fever were clearly traceable to contact with mild cases regarded as "colds" or "only German measles". Only a few of the more severe cases which had occurred had been attended by physicians and quarantined.

Cases in quarantine, and those in which the diagnosis was in question, were visited with health officer and detailed information was collected concerning the whereabouts and associates of each case during six days previous to onset, especial attention being given to the three days just prior to onset. The close associates of each case were traced and the members of the affected households were inspected for suspicious signs and note was made if they had had scarlet fever previously.

The usual simple methods for keeping track of cases and exposed persons were demonstrated to the health officer.

1. A spot map with each house under quarantine bearing a map-location number.
2. A list giving map-location numbers, names of householders, number of cases and dates of quarantine.
3. A card for each quarantined house, with map number, street address, name of head of house and full notes concerning milk supply, laundry, wage-earners, children in house, isolation, exposure previous to isolation, and of inspection of exposed persons.
4. A card for each case giving detailed epidemiological information and map number and other data of identification.

5. Sample of letter of notification to be sent to health officers of districts concerned, when non-residents go home after exposure, or develop scarlet fever while away from home.

The health officer was urged to immediately investigate every case or suspected case and to follow up every exposed person, as well as to determine the source of infection and see that necessary measures for public safety were carried out. The school and health board held a joint meeting, which the physicians also attended. The situation was discussed and detailed instructions were written out for coöperative work between existing agencies, *i. e.*, health officer, schools, and physicians; for existing agencies aided by a school nurse, and for existing agencies aided by a nurse and a medical supervisor of schools. The collection of additional data from physicians, the visiting of certain cases, the study of means available for relief, and the outlining of methods for use by the health officer and school authorities had occupied one day.

As soon as the above meeting was concluded, the epidemiologist left for headquarters, having been in "A" from noon, Thursday, until 10 p. m., Saturday.

As previously stated, this incident is related because it shows a state of extreme unpreparedness on the part of all concerned, and yet results were obtained through the application of simple, practical measures.

Let us consider how such epidemics might be averted. We will assume that the infection is introduced at "A" by a non-resident student who developed a sore throat promptly

after his arrival. Three days later a companion is suddenly taken ill with vomiting, fever, sore throat, headache and rash. A diagnosis of scarlet fever is made and the case is reported. The health officer investigates and finds that the recognized case has exposed no one outside his family, which is at once quarantined. The student with the unrecognized scarlet fever sore throat has met many friends at his room and has visited the homes of others, has attended Sunday school and the movies. Noting the whereabouts and associates of the non-resident, the health officer first traces and examines those who had the closest, most frequent and prolonged associations with him. Some are found to have had scarlet fever previously. They are told that one attack usually confers life immunity, but second attacks occur and that they must isolate themselves immediately and notify the health officer if any suspicious symptoms, such as hoarseness, sore throat, fever, headache, nausea, vomiting, or rash, develop within a week after last exposure.

Others have not had scarlet fever. The health officer explains to them the nature and infectiousness of mild scarlet fever and describes the onset of ordinary clinical cases. He directs them to remain at home and in isolation if children are about, or to come to him for inspection daily for six days after last exposure.

Items of information forgotten, overlooked or concealed by the student may be unconsciously supplied by his intimate associates. Then still other persons who were exposed are

now followed up by the health officer. He gives advice and directions, according to circumstances, being guided by common sense and a careful consideration of all the factors concerned.

He notes fifty persons, possibly, as "exposed." Forty may be children or young adults and fifteen of these have had scarlet fever previously and probably are not susceptible. There remain thirty-five who should be supervised for six days after their last exposure. Since ten are of an age rarely affected by scarlet fever, warning may be sufficient. However, since wage-earners do not like to lose time and may not follow directions if only slightly ill, daily inspection is safest for all.

The supervision of twenty-five or thirty-five persons for six days is not very difficult and even if the exposure was quite intimate, it is unlikely that more than five will become foci of infection, and probably one or two of them will be typical cases and give no trouble about quarantine, isolation or hospitalization.

The lighter cases developing under supervision will not expose anyone except possibly members of their households, and there should be no difficulty in enforcing the necessary restrictions. Just as the real epidemic at "A" was terminated, so it might have been averted.

GENERAL PRINCIPLES IN CONTROL OF SCARLET FEVER.

Hospitalization or isolation in care of a qualified attendant is preferable to house quarantine. When quarantine is unavoidable, every privilege

consistent with public safety should be given to the wage-earners. If common sense methods of "humanized quarantine" are used, people will coöperate and accept the discomfort due to restrictions, without complaint.

Quarantine should not be unnecessarily prolonged. If the nose, throat and ears are normal when the minimum legal period expires, quarantine should be raised, even if desquamation is still present. However, no patient should be permitted to return to school or to attend public or private gatherings until a second examination, made not less than a week after release of quarantine, shows a continuance of normal conditions. If ear discharge persists, suitable precautions should be taken to obviate possible infection from the discharge, and then the child should be allowed to attend school.

The possibility of "scarlet fever carriers" must not be overlooked in tracing the source of infection. Experience has convinced the writer that persons immune to scarlet fever, may become "carriers" and while their throats may show irritation, no other signs can be demonstrated.

The social gatherings, the homecoming of students on vacation and the presence of relatives and other guests in a community at the holiday period, or on account of conventions, fairs or church celebrations, may be a large factor in the problem and should always be carefully considered.

The protection of transients during an epidemic may be effected by enlisting the aid of hotel men and boarding-house keepers in the supervision and inspection of their employees.

Such aid can be obtained by showing that business interests are involved and must be safeguarded.

Reporting of cases and suspects should be encouraged. "Red tape," and criticism, real or implied, of a physician's mistakes in diagnosis or unwise advice about infectious diseases, discourages reporting.

A personal acquaintance with physicians, an appreciation of their coöperation, a willingness to assume responsibility, and a singleness of purpose on the part of the health official, are essential to his efficiency.

It is wise to keep in close touch with every agency through which information of value in public health work can be secured, especially with

school authorities, visiting nurses and civic organizations. Such agencies and the press must have a sympathetic understanding of the purpose and value of special measures in order that their intelligent coöperation and favorable influence may be secured.

Milk as a factor in the spread of scarlet fever is not mentioned, for, important as it is, the epidemiological diagnosis is usually very easy and the remedial action is obvious.

Local health officers are notoriously underpaid and unappreciated, and cannot afford to give sufficient time and consideration to their official work to include in it this essential in the control of scarlet fever, the follow-up and supervision of exposed persons.



PROGRESS IN THE MILK INDUSTRY.

Regulations involving the sanitary conditions under which cattle producing milk are kept, as well as the conditions of the premises on which milk is produced and handled, began to be enacted as early as 1895. Contemporaneous with the development of this inspection movement was the growing interest in the subject on the part of the medical profession, as exemplified in medical milk commissions. These numbered about seventy-five in 1914. They have been instrumental not only in the production of what is now familiarly known as "certified milk," but also in educational propaganda which has been very effective in improving and appreciating the quality standards of the milk sold in many cities. The subject of pasteurization has been broadly ventilated, and the entire practice put on a rational basis. The question of bovine tuberculosis has been faced in a scientific way. Popular prejudices like those against milk from silage-fed cattle have been modified to fall in line with the best suggestions of animal nutrition, dairy bacteriology, economics and sanitary science. Some of the changes initiated have

resulted only after considerable friction between the financial and the hygienic interests concerned. This, however, is not a new experience in the attempts of scientific knowledge to modify current procedures. Inertia is found in all walks of life. The gratifying feature of the modern milk industry is that it truly represents the application of scientific investigation. Progress has been based for the most part on study rather than mere empiricism, and the possibilities of popular education in scientific matters have been exemplified in a degree that is both significant and encouraging. To quote a recent writer, success does not flourish under an attitude of antagonism growing out of compulsion, but under one of coöperation. The inspection agencies have thus been a medium of instruction, and the experiment stations in their investigations have had the producer in mind quite as much as the consumer, in order that he might improve his business in producing a better quality of product.—*The Journal of American Medical Association.*

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BUBONIC PLAGUE.

The thorough epidemiological study by Creel, published elsewhere in this issue of the JOURNAL, is strongly confirmatory evidence of the all important rôle of the rodent in the transmission of bubonic plague.

Ever since the nature of plague became clearly established, the theoretically equal possibilities of infected fleas being transported on the one hand by inanimate objects and by human beings, or, on the other, directly by the rat, has led observers to divide into two groups as regards their views of plague epidemiology.

Both parties agree that the rat is the original reservoir of plague infection; that the disease is essentially a disease of rodents; and that only secondarily, almost accidentally, does it infect humans. Both agree that the immediate link of transmission is the flea, itself immune but with its digestive tract teeming with plague bacilli drawn from the septicæmic dying plague rat.

But one group of observers were led by epidemiological studies, now clearly imperfect in the matter of rodent surveys, to consider the flea as the important factor in human infection, because of its relatively great capacities for locomotion and the ease with which this insect could be transported for considerable distances without detection. They believed that the best immediate line of defense against plague was the carrying out of measures designed to destroy fleas, and, while recognizing the fundamentally rodent character of the disease, did not regard anti-rodent measures as the all essential factor in combating plague.

The other point of view has been the rat, first, last and all the time. The

Federal Public Health Service plague workers in various parts of the world and the Australian and Japanese sanitarians have been perhaps the foremost exponents of this practically exclusively anti-rat plan of plague campaign.

At the present time, it would appear as if the evidence is sufficiently conclusive to justify the ignoring of the possibilities of long-range flea transmission and to permit the centering of all anti-plague effort directly upon the rat.

The logical deductions from certain now thoroughly demonstrated facts regarding plague, such as the rodent nature of plague persistence in any once infected locality and the ease with which fresh rodent plague infection can be introduced from without, permit the formulation of a few general principles which no seaport city, at any rate, can safely ignore. These are:

1. That bubonic plague is essentially a disease of rodents.
2. That, once introduced into the rodent population of any city, the eradication of plague is an extremely difficult, slow and expensive task.
3. That, once introduced among rodents, plague is almost certain, sooner or later, to appear among humans, but that this will only occur, in any considerable number, after the epizootic becomes very widespread and in places where close joint occupancy of premises by man and rat is marked.

Based upon these fundamental conceptions of the nature of a plague infection in any city, the logical weapons of defense are:

1. The exclusion of plague infected rodents, as far as possible, by those methods of maritime quarantine that experience has found most efficacious, viz., routine fumigation to *destroy* rats, proper fending at docks, the construction of rat proof docks, etc.
2. Careful routine rodent surveys to detect at earliest possible moment any foci of rodent plague already established.
3. Immediate rodent destructive measures about any foci so discovered to prevent, if possible, their extension to fresh foci.
4. Fully recognizing the futility of attempts to permanently solve a rodent plague infection problem by these destructive and harrying methods, the community which wishes to permanently settle its plague problem must do as San Francisco and New Orleans have done and are now doing. This means the building of the rat out of a city by thorough-going routine permanent rat proofing, the starving of the rat out by shutting off any possible source of rodent food supply, and the discouraging of rat breeding by seeking out and breaking up their habitations.

THE NEED OF BETTER CONTROL OF SOME NEGLECTED CONTAGIOUS DISEASES.

J. E. LANE, M. D.,
New Haven, Connecticut.

Read before the New Haven Medical Association, September 15, 1915.

Under the title here given, Doctor Lane discusses ringworm and favus of the scalp as communicable diseases. Reference is also made to infections following vaccination and finally Doctor Lane speaks of the problem of syphilis, of which he says, "We realize its importance but in most places we do nothing about it."

AT THE Dermatological Clinic of the New Haven Dispensary my attention has been attracted, during the past year, to some conditions in the management of certain contagious diseases in this city, which, it seems to me, are susceptible of improvement.

While there will doubtless be considerable difference of opinion among us as to the importance of these diseases, and of improving the supervision and treatment of them, I think it worth while to consider some facts, which are perhaps not universally appreciated. I shall state the points that have occurred to me, without attempting to formulate in detail plans for carrying out the improvements that seem to be indicated.

RINGWORM AND FAVUS OF THE SCALP.

Physicians whose patients belong to the better classes of society possibly do not realize that ringworm and favus of the scalp are of any consequence in this community. That these diseases have not become so prevalent as to force themselves on the attention of more places in this country, as they

do force themselves on that of some other countries, is no doubt largely due to better hygienic surroundings here than in those localities where they are especially troublesome, but it is also very largely due to the fact that our federal government has for a long time recognized their seriousness, and has rigidly enforced the law requiring the deportation of all immigrants found to be affected with them. Ringworm and favus of the scalp do not affect the mortality rate, nor do they have a very appreciable influence on the health of the individuals who suffer from them. Their chief importance to the public is that they interfere with the education of the persons affected. This they do to a considerable extent as they are both diseases of long duration and are pre-eminently diseases of the school age. Ringworm of the scalp rarely exists after this age, as it is cured spontaneously with the approach of puberty.

Ringworm.—Ringworm of the scalp is a common disease in this city. No estimate can be made of the number of cases that exist, and no proof as to whether or not they are increasing

can be given, as no records are kept. Judging solely by the number of cases that I have seen at the Dispensary, I am willing to venture the assertion that they run into the hundreds at the present time, and judging by the care that is given them, that they are increasing.

Let us see first what is being done with these cases, and the results of the work.

As far as I can find out, the health department is authorized to take no action in regard to them except to exclude from school the affected children discovered by the school nurses. The school physicians, if I am correctly informed, do not examine the heads of the children, the only examination made being that of school nurses. No record of the cases so discovered is kept, except as the individual nurse voluntarily keeps the record of her own discoveries.

No doubt the majority of cases found are discovered by the nurses. What proportion of the total number of cases in school is so discovered, there is at present no means of knowing, there being no check on these examinations. It is probable that eventually a large proportion of them are discovered, but in other places, where schools, in which ringworm has been found, have been inspected by physicians trained to recognize the disease early, more undetected cases have been found than cases that were already diagnosed. This is in no sense a criticism of the nurses. On the contrary, I have nothing but praise for the interest and efficiency of all of

them with whom I have come in contact.

The fully developed case of the commonest variety of ringworm of the scalp (the microsporon) is easily recognized by anyone, but its early diagnosis is not so easy. We also have here the other two varieties of ringworm (trichophyton endothrix and trichophyton endo-ectothrix). The fully developed cases of these are very easily overlooked by persons unfamiliar with them, and the early cases may be very difficult of diagnosis, or, in a few cases, impossible without a microscope. These two varieties do not ordinarily form the large round patch, covered with scales and stumps of hair, but form smaller, irregular, slightly scaly spots, on which there are frequently but very few broken hairs.

An examination of a few dispensary records, and inquiries of children or parents, has shown that some cases at least of ringworm of the scalp have been overlooked by the nurses. I will give one of several instances that I have come across accidentally. A child came to the dispensary something over two years ago. Diagnosis of ringworm of the scalp was made. During the past summer he made his second appearance, having been in school in the meantime. I did not see the child the first time, but, from his appearance at the second visit, I judge that the process had extended.

Aside from the cases found by the school nurses, a considerable number of cases are seen in the Dispensary, voluntarily sent by their parents. There are no doubt some cases seen by

physicians in their private practice, but I only mention them incidentally, as the patients are undoubtedly in a better environment and better cared for by their parents.

When the diagnosis of ringworm is made at the Dispensary, a card is given to the patient saying "This child has a contagious disease and should not be allowed in school." That ends it as far as the Dispensary is concerned. Some of the cards are delivered to the school authorities by the children. Some are mislaid or forgotten, and, if he and his parents desire it, the child goes to school just the same, if he is successful in escaping detection by the nurse, as the case just cited shows.

The treatment at the Dispensary and by the nurses is essentially the same. An ointment is provided and instructions given as to its use. This is about all either of us is equipped to give. If there is any difference in the efficiency of the treatment, the advantage is with that of the nurses, for their cases are more or less supervised, while the Dispensary cases have no supervision except as they return voluntarily.

The results of this state of affairs are these:

(1) We do not know how many cases of the disease we have to contend with, nor where they are.

(2) If the children stay out of school until cured, they lose a couple of years of school, and distribute the disease to other children of the family and neighborhood. In families of several children, it is the exception for only one to be affected.

(3) If they continue in school, they distribute it both at school and at home. Incidentally they are free to frequent the barber shops. It is fortunate that ringworm of the scalp is very rarely communicated to adults, and that the commoner variety of fungus attacking the scalps of children does not attack the beard.

(4) Under the best circumstances, when thoroughly carried out, the treatment for ringworm, as *prescribed* by the nurses and at the Dispensary, takes on the average two years to cure the common variety of ringworm. When we consider that "soaking the hair in absolute alcohol for as long as twelve hours will not inhibit the growth of the fungus" we cannot expect much from the antiseptics used even when the treatment is well carried out. As it is *carried out* by people in circles where a goodly number of head lice is considered only a slight cosmetic defect, I have no hesitation in asserting that it has very little effect either on the duration of the disease in the individuals affected or in preventing its spread to others.

As we already recognize this disease as of sufficient importance to exclude from school those suffering with it, and as the loss of time to many children is great, it seems to me that we should handle it better. To do this we need:

(1) First of all to know how many cases we have to deal with, and to that end all cases ought to be reported to the health authorities. All cases would not be reported until we have different rules than at present, but some physicians would report cases if asked to do so. That we cannot depend upon all phys-

icians to report cases, even when the law requires it, is proven by the reporting of the cases of tuberculosis, a very large percentage of which are not brought to the attention of the health authorities until after the death of the patients. But certainly all cases discovered in school and at the Dispensary can be reported, as well as those found by visiting nurses and Lowell House Dispensary. This would give a good basis to work on.

(2) When a few cases are discovered in a school room, all the children in that room should be examined by someone competent to discover the early cases.

(3) Wherever a case is found, it should be ascertained whether there are other children in the family to which the child belongs, and if there are, all these children should be examined.

(4) A careful record of all cases should be kept and the parents should be persuaded to have the children treated.

(5) We should prepare ourselves to give efficient treatment and get the children back into school as soon as possible, a thing which at present we are not prepared to do.

Ringworm of the scalp cannot be cured by the application of parasitocides. Depilation is necessary and the only satisfactory methods of depilation thus far discovered is the X-ray. Depilation of the affected area cannot be satisfactorily accomplished with forceps as the hairs are

so brittle that they cannot be pulled out, but in early cases the disease can be effectually limited by depilation of sound hairs around the affected area. With the X-ray any case of ringworm can be cured within three months. The requirements aside from the apparatus are, if the whole head has to be depilated, two hours of an operator's time, supervision of the antiseptic of the head until a week or two after the hair has fallen, and a final inspection before the child is returned to school. These things should in some way be supplied.*

Recently a vaccine has been developed by Strickler of Philadelphia, by the use of which he reports obtaining a number of cures in eight weeks. The cases in which it has been used are so far too few, and the time that has elapsed since he began his work too short to warrant definite statements as to permanent results in all cases. If further experience proves the treatment to be successful, it will be of great value, but for many reasons not necessary to go into, it is less suitable for routine treatment of the cases under consideration than the X-ray.†

Favus.—We all know that favus in some countries is a common and formidable malady. That it is not more common here is, as I have stated above, chiefly due to the vigilance of the federal government in excluding immigrants affected with it, and not to the care of cases found here.

There is still a persistent belief that the cases in this country are almost all

* For details of X-ray treatment see Sabouraud, Les Teignes, Paris, 1910, and a recent article by McKee, Med. Rec., Aug. 7, 1915.

† On vaccine treatment, see Bloch, Muench, Med. Woch., June 1, 1915, page 737, and Strickler, Journal A. M. A., July 17, 1915, page 224.

imported ones, and that it is exceptional to find it in children of American birth. This is not true, and was proven to be untrue as long ago as 1896, by Wende of Buffalo, who found twenty-two out of twenty-nine cases in Buffalo originated in this country, and twenty-one of the patients were of American birth.

Favus is a near relative of ringworm, and what has been said of ringworm applies, for the most part, equally well to favus. It is less contagious than ringworm, spreading especially among inmates of the same house, and often persisting in the same house for generations. For the individual it is a much more serious disease than ringworm, as it is not spontaneously cured at puberty, but usually continues its slow progress till all the hair of the scalp is eradicated, which frequently is not until old age. If allowed to continue in this way, it makes its victims loathsome and disgusting objects, truly deserving pity. If cure is not effected early in the disease, large areas of baldness are left.

The treatment of the few cases that come to the Dispensary is with the ointment used for ringworm, which is about all that institution is equipped to give.

The use of antiseptics in ointments and other vehicles is even less efficient than in the case of ringworm. About the only good they accomplish when used alone is to make the patients less disgusting, and render them less contagious. The family of the patient soon discovers this and stops sending the child for treatment. We might as well expect to cure scabies

with Christian Science as to cure favus of the scalp with antiseptics alone. These, to be sure, must be used, but used in combination with depilation which is best accomplished with the X-ray. The only other satisfactory method is repeated depilation with forceps, which is a long and tedious task.

That we have something of a favus problem here will probably surprise most of you. At the Dispensary some time ago my attention was attracted to the matter by a boy, who is now 13 years of age, and who has been treated at the Dispensary with more or less regularity since December 16, 1910. His head was tolerably clean, though the only spots free from the disease were those where the hair had been destroyed and scars formed. As nearly as I could make out, he had been to school at some time or other for about six months, during his life. I found that there were other children in the family, so I paid him a call at his residence, which is in a crowded tenement house, containing seven families, and thirty-one children. In his family there are nine children, ranging in age from two to twenty, all born in New Haven. I have not yet been able to see them all, but among those that I have seen I found four more cases of favus. The ages of the children found with it are ten, eight, six and two. With the exception of the child of two, in whom the disease had not progressed so far, the heads of all of them were practically covered with crusts. None of them with the exception of the boy mentioned, had ever been in school.

I reported these cases to the Health

Department, but I think that they have no authority to supervise them, and they certainly are not prepared to treat them, and perhaps they could not be expected to be. They ought to be in a hospital till cured. As the Health Department appeared to be impotent in the matter, I appealed to the Visiting Nurse Association and by their efforts the children have been made a little less dangerous to the other children in the family and neighborhood.

To the same Association I am also indebted for unearthing another nest of favus in a house with three families and nine children. This time it was in a family of five children of the ages of twelve, eight, six and four years and a baby of ten months, all born in this city. None of them have ever been in school, and every one of them has the disease. Individually and collectively this family was as good an illustration of untreated favus as I have ever seen. Their heads were covered with crusts half an inch thick and with blood and scabs from scratching, all attempts at cleanliness having evidently been abstained from. The Visiting Nurse Association also volunteered to do what they could for this family.

It is clear from the facts presented that, for a city of this size, we have a considerable number of cases of favus. With the number of cases discovered practically by accident, living in crowded quarters and some of them known to have existed for over five years, it is probable that there are still some undiscovered cases.* It is evi-

dent that the patients now known must be cured, and that we should try to find out whether other cases exist here. We cannot, after we have found it, allow this disease to continue until it makes its victims the deplorable objects which I have described, depriving them of all education, and also, on account of their disgusting appearance, of a large part of the opportunity of securing work at which they might earn a living.

In order that we may know whether other cases exist here we must do two things:

- (1) Report any cases of favus that are discovered, and search for other cases in the immediate vicinity of those found.

- (2) Investigate cases of other chronic diseases of the scalp, including ringworm, the nature of which is not evident. The reason for this is that favus frequently develops in atypical forms, without the scutula which make the diagnosis easy when they are present. In some instances it much resembles ringworm, pityriasis, impetigo, dry eczema, or psoriasis. So much so that the uninitiated or even the practiced observer may at first be deceived by the appearance. This is especially true in cases that have received some treatment.

The authority must be given to the health department to supervise these cases, and some way and some place must be found to treat them. A hospital is the place for them till cured, because of the difficulty of enforcing regular treatment elsewhere. The proper treatment I have already re-

* Other cases have been found since.

ferred to, and if we cannot furnish the X-rays, we must get out our forceps and prepare to pull out hairs for a year or two.

Houses in which favics have lived should be thoroughly disinfected when the house is vacated. Each of the two families referred to has lived in five different tenement houses in the last few years. As the spores live in the scutula for about two years the opportunities for infecting others who subsequently occupy the rooms are good, if there is no disinfection.

The Dermatological Clinic is the logical place to treat patients with these diseases, except such as can be placed in hospitals. X-ray treatment should be supplied. In addition to this a nurse on full time attached to the Clinic would be of the greatest value in supervising the subsequent treatment, or in treating those patients who would not submit to X-ray treatment. Any plan of treatment must provide for frequent calls at the homes of the patients, as they cannot be depended on to report regularly at the Dispensary. A nurse would also be of great assistance in cleaning up many other filthy diseases that we have to treat, which drag on indefinitely with the poor and careless supervision given by the parents. If X-ray treatment is not provided such a nurse will be fully occupied for many months if she has nothing to do but treat the cases of favus we have on hand. Perhaps by combining the resources of the different associations and departments that should be interested in these matters, a nurse can be supplied without laying a heavy burden on any

of them. As ringworm and favus of the scalp are of sufficient importance to be excluded from the country by our federal government, no apology is needed for suggesting that serious attention be paid them when they develop here.

POST-VACCINAL INFECTIONS.

Serious accidents as the result of vaccination itself are negligible, and serious results from neglect following vaccination are not extremely frequent, and no sane person who has had any experience with smallpox, and who is competent to judge, would consider abandoning vaccination even if there were many more accidents than at present. On the other hand, when vaccination is compulsory, and when it is done by public officials, it seems to me to be perfectly self-evident that it is the duty of the public authorities to see to it that it is done under such conditions and with such precautions as to make the complications following it as rare and as little dangerous as possible. Even if it is not considered a duty, it would be public policy to do so, in order to lessen as much as possible the reasons for the perennial protests of the anti-vaccinationists. They cannot be silenced by facts or arguments, for they are firm believers in their position, and in this instance it is certainly true that "where belief begins, logic loses all its rights." But there is certainly no excuse for *our* furnishing them with *sound* premises for a *logical* argument for their belief, as we do when we allow preventable diseases to develop on vaccination wounds. The development of one

such case, with the wide publicity it is certain to obtain, adds incalculable difficulties to the accomplishment of vaccination in the locality where it occurs.

Last winter before the New York legislature one of the arguments urged by the anti-vaccinationists, who were working for an amendment of the present vaccination law, was that "although the virus is pure some evil results are likely to follow vaccination because of later infections."

Within the past year I have seen several badly infected arms at the Dermatological Clinic. I presume that there have been more in other clinics, as such cases reach the Dermatological Clinic only by accident. Last winter Doctor Tracy reported to this Association a case of tetanus following vaccination, also performed by the public authorities. Fortunately it was not fatal.

It is well known that, at the present time, such infections are never introduced in the vaccine, and only in rare cases by the vaccinator. They are introduced later by lack of care and cleanliness, conditions which we are bound to take into consideration in most of the publicly vaccinated cases.

In order to prevent these infections and to render them as little serious as possible when they do occur, it seems to me that the least that should be done is to see to it that all children vaccinated by public officials are inspected at such intervals as may be necessary, until all such danger is past. In no other way can infections

be prevented and treatment instituted at once when it is needed.

At present this is not done. Furthermore no record of public vaccinations is kept, either by the Health Department or by the school physicians.

Dr. John F. Anderson, of the United States Public Health Service, has recently published an exhaustive study on the Relation between Vaccine Virus and Post-vaccination Tetanus.* I will quote part of the editorial comment on this study made in a recent issue of the *Journal of the American Medical Association*:†

"The efforts of health authorities to promulgate vaccination are often opposed by the argument that the complications of vaccination may be of more moment than an attack of small-pox. . . . Anderson's conclusion was that cases of tetanus occurring fifteen or twenty days after vaccination do not receive their infection through the vaccine virus, but in all probability the infection is received after vaccination by a contamination of the vaccination wound such as may occur in the infection of any other surgical wound not properly cared for. References have been made repeatedly to the importance of the proper care of vaccination wounds and to the failure of physicians to give this minor surgical operation the care it deserves. The complications of vaccination can be greatly reduced, if not entirely avoided, by the use of proper technic in vaccination and in seeing that the wound and 'take' are properly looked after. Every physician who does a vaccina-

* Public Health Reports, July 16, 1915.

† Journal A. M. A. Aug. 7, 1915. LXV, page 532.

tion should see the patient at least once after the development of the vesicle to satisfy himself that the wound is properly cared for.

"Vaccination is a surgical procedure, and is worthy not only of the painstaking asepsis of the skilled physician at the time of operation, but of his intelligent after care as well."

SYPHILIS.

The position that syphilis occupies in this country is almost incomprehensible. There is probably more written about it than about any other disease with the exception of tuberculosis and cancer. We realize its importance, but in most places we do nothing about it.

Perhaps, if the fact that syphilis in a considerable percentage of cases is a non-venereal and innocently acquired disease, were better known to the public together with the fact that the innocent need protection from it, those who now believe that it should not be interfered with, considering it a just punishment for sins of commission, would modify their convictions.

That public supervision of irresponsible syphilitics in the contagious stages of the disease is needed is a position no longer under discussion. The following instance is a good illustration of the fact.

Last June a woman appeared at the Dispensary with untreated secondary syphilis. Her face was covered with enormous papulo-tubercular syphilides. Her mouth was filled with mucous patches and her teeth were in the worst possible condition. Her axillæ, breasts and groins were covered with moist

papules. Her vulva was swollen and the mucous patches with which it was covered were freely oozing. Her husband was too sick to come with her that day, being in bed with "malaria." A few days later he came and his "malaria" was syphilis, and his condition nearly as bad as hers. Dr. Rosoff, the Dispensary dentist, offered to put the mouths in condition, but, as the process promised to be somewhat painful, only one visit was paid him, and they disappeared from my observation.

Now this woman until about the time I first saw her had been a chambermaid in one of our best hotels. Not unnaturally she was discharged on account of her personal appearance. Having lost her position, and her husband being out of a job, they had to do something, so they both went home and started a boarding house. The possibilities of this situation are self evident.

Until public opinion is sufficiently aroused to permit supervision of such cases, we are almost helpless. Still there are some things that we can do that might help a little, and we ought not to neglect them while we are waiting for more efficient means. While it is true that we cannot compel patients to undergo treatment, and cannot restrain them until they are no longer frankly contagious, still we could offer hospital treatment to such as are willing to accept it. It is unfortunate that our city, in common with most others in this country, does not offer such treatment, and that our hospitals receive such cases with reluctance. Some such hospital accommodation should be provided as soon as possible.

Another thing that would be of benefit, and would reach some of the cases that could not be persuaded to accept hospital care, is to supply the means for furnishing proper treatment at the Dispensary. At present salvarsan is available only to those who can pay for it themselves. There are few who can pay for one dose, and fewer still who can pay for the needed number of doses.

One of the important services that salvarsan is able to render to the public health is that it materially lessens the time of the actively contagious stage of syphilis. This is a very important point in any case of syphilis and an

especially important one in the class of cases that frequent the dispensaries. This need should be presented to the proper authorities with force enough to secure the necessary funds for such treatment.

I have not exhausted the list of diseases in my province to which more attention should be given. For example, the treatment we offer to patients with scabies is such that in many cases we can still with perfect propriety apply to the disease its old name of "seven year itch." But my paper is already much longer than I originally intended it to be, and I will end it by thanking you for your attention.



ESTIMATE OF SICKNESS AND ITS COST AMONG THE 33,500,000 OCCUPIED MALES AND FEMALES IN THE UNITED STATES.

1910.

Estimated number of cases of sickness, on the German basis of 40 per cent. of the number of persons exposed to risk.....	13,400,000
Estimated number of days of sickness on the German basis of 8.5 days per person per annum.....	284,750,000
Estimated loss in wages at an average of \$1.50 per day for $\frac{6}{7}$ of the 284,750,000 days..	\$355,107,145.00
Estimated medical cost of sickness at \$1 per day for 284,750,000 days.....	\$284,750,000.00
Estimated economic loss at 50 cents per day for $\frac{6}{7}$ of the 284,750,000 days.....	\$122,035,715.00

Total social and economic cost of sickness per annum	\$772,892,860.00
Estimated possible economic savings in the health of individual workers on the basis of 25 per cent. reduction per annum.....	\$193,223,215.00

While the above figures are but estimates, it is nevertheless true that an enormous economic loss might be prevented. This saving will increase as rapidly as working conditions are improved, and warrants the expenditure of large sums of money and much effort in reducing the amount of sickness and death due to industrial accidents and occupational diseases.

This justifies the maxim that "Public Health is Purchasable."—*Boston Monthly Health Bulletin*.

THE SIGNIFICANCE OF THE MORTALITY RATES OF THE COLORED POPULATION OF THE UNITED STATES.

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Read before the Vital Statistics Section of the American Public Health Convention, Rochester, N. Y.,
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BY THE colored population in the present instance is meant the negro population, although in the discussion which follows, rates published by the Bureau of the Census, including Negro, Chinese, Japanese, and Indian, will be used. The Chinese, Japanese, and Indian factors have been practically eliminated, however, by using for comparison only population groups containing these elements to a relatively negligible extent.

According to the census of 1910, the total population of the United States (exclusive of outlying possessions) was over 91,000,000, and the negro population over 9,000,000. In many localities the negro population constitutes from 20 to 50 per cent. of the total. In the study of local mortality rates, therefore, the death-rates of the colored (negro) population merit separate attention. This is more particularly true of cities in which the colored population constitutes a considerable part.

Effective registration of deaths has revealed, especially in those localities where the negro forms a relatively large element of the population, that the colored death-rate is much higher than that of the white population. To one interested in the public health the

questions which will arise in connection with this difference between the white and colored death-rates are (1) the reason for the difference; (2) whether the cause is an essential one, inherent in one element of the population and not in the other, and, finally (3) whether the factors which produce the difference in the death-rates can be removed and the colored death-rate lowered until it approximates that of the white element of the population.

THE REGISTRATION AREA.

When, in communities in the United States registration area for deaths having a considerable negro population, the deaths of the negro population and of the white have been separately considered, it has usually been found that the colored death-rates were higher than the white death-rates. This has also been true of the registration area of the United States as a whole. In 1913 the death-rate of the white component of the population of the registration area, as given by the Bureau of the Census, was 13.7 per 1,000 inhabitants, and the death-rate of the colored population 21.9. If, however, a further division be made into urban and rural death-rates, as classified by the Bureau of the Census, the white death-rate in cities

(having over 10,000 inhabitants in 1910) of the registration states was 14.6 and the colored 24.3, and the white death-rate for the rural portion (including cities having less than 10,000 inhabitants) of the registration states was 12.5 and the colored 17.7. In each instance the colored death-rate was considerably higher than that of the corresponding white population, the greatest difference between the rates being that between the white and colored urban populations, and the least difference that between the white and colored rural populations, of the registration states.

satisfactory and that the figures given represent at least approximately the actual conditions.

The figures indicate that the death-rates of both white and colored for the registration states as a whole are higher for the population living in cities of 10,000 inhabitants and over than for those living in small cities, towns, and strictly rural localities, and that while for the white population the difference in the death-rate in 1913 was only 2.1 per 1,000 inhabitants, the difference for the colored was 6.6. Figures for the year 1912 differed but little from those for 1913.

REGISTRATION STATES.

It is of interest to examine the white and colored rates for smaller population groups. These rates for the individual registration states in which the population has but a relatively small component of Chinese, Japanese, and Indian show the same condition of higher colored death-rates, the ratio of the white rates to the colored varying in the different states.

The colored death-rates in certain states were exceedingly low, in some instances much lower than those of the white population. In Vermont, for instance, the death rate of the white population was 15.8 per 1,000 inhabitants in 1913 and of the colored, 6.6. This rate, however, is readily accounted for by the age distribution of the negro population of the state which consists very largely of young adults and contains relatively few children.

For the present purposes of comparison an effort has been made to

	Rates.	
	1913.	1912.
Registration area.....	14.1	13.9
White.....	13.7	13.5
Colored.....	21.9	22.9
Cities in registration states:		
White.....	14.6	14.4
Colored.....	24.3	23.7
Rural part registration states:		
White.....	12.5	12.3
Colored.....	17.7	17.7

The death-rates for the white and colored populations approximating each other most closely were the rates of the urban white population and of the rural colored, the urban white in registration states being 14.6 and the rural colored 17.7.

While the possibility is borne in mind that the low rural colored death-rate may be due to a less satisfactory registration of deaths in rural colored populations, it is assumed that the registration in registration states is

eliminate the states having colored populations which, because of their age distribution or for other reasons, are not comparable. While the death-rate of the colored population of the registration area as a whole in 1913 was 21.9, the rates in the states chosen for comparison varied from 24.2 in Ohio to 18.2 in Virginia.

Registration states.	1913.		1912.	
	W.	C.	W.	C.
Indiana.....	13.1	23.8	12.8	22.3
Kentucky.....	12.1	21.0	11.8	21.0
Maryland.....	14.4	24.0	14.0	22.4
Massachusetts...	15.0	20.1	14.9	20.5
New Jersey.....	14.1	20.5	13.8	20.4
New York.....	14.9	21.7	14.8	23.2
Ohio.....	13.5	24.2	13.1	22.2
Pennsylvania.....	14.4	22.1	13.9	18.0
Virginia.....	11.8	18.2	....	....

REGISTRATION CITIES.

In the cities having 10 per cent. or over of colored population a still greater variation in the colored death-rates is found. The rates varied from 37.2 for Charleston, S. C., 32.2 for Savannah, Ga., and 31 for Baltimore, Md., to 15.2 for Coffeyville, Kan., 16.3 for Atchison, Kan., and 21.9 for Pittsburgh, Pa. The low rates of Coffeyville, Atchison, and Pittsburgh are probably due to some extent to the age distribution of the colored population. More typical urban colored populations with low rates, better suited probably for comparison, are those of Washington, D. C., with a death-rate of 24.4, and of Roanoke, Va., with a rate of 22.5.

	1913.		1912.	
	W.	C.	W.	C.
Registration area.	13.7	21.9	13.5	22.9
Washington, D. C.	14.4	24.4	14.8	26.9
Mobile, Ala.....	16.9	25.7	16.7	26.0
Savannah, Ga....	17.3	32.2	18.4	34.4
Atchison, Kan. ...	11.2	16.3	11.7	11.8
Coffeyville, Kan..	9.7	15.2	11.6	19.7
Kansas City, Kan.	13.9	25.9	14.2	28.5
Lexington, Ky. ...	20.4	30.2	21.5	30.3
Baltimore, Md. ...	16.2	31.0	16.3	29.2
Springfield, O. ...	13.4	20.4	12.5	16.8
Charleston, S. C..	15.7	37.2	19.0	41.4
Norfolk, Va.....	13.4	29.9	13.9	30.7
Roanoke, Va.....	13.3	22.5	11.6	21.6
Pittsburgh, Pa. ...	16.9	21.9	15.8	18.8

The cities tabulated have been selected to show the variation in colored death-rates in cities having colored populations in a measure comparable. If the colored death-rates of certain of these cities are examined, it will be found that they have fallen considerably during the last decade. The annual average colored death-rate of Mobile, Ala., during the years 1901-05, inclusive, was 31.2, while that for the year 1912 was 26, and for 1913, 25.7. A similar reduction occurred in Washington, D. C., from

	1913 Colored.	Annual average 1901 to 1905 Colored.
Mobile, Ala.....	25.7	31.2
Washington, D. C. ...	24.4	29.5
Jacksonville, Fla. ...	22.6	30.5
Atlanta, Ga.....	25.2	29.6
Louisville, Ky.....	24.8	28.1

29.5, as the annual average for the years 1901-05, to 24.4, the death-rate in 1913. In Jacksonville, Fla., the reduction was from 30.5 to 22.6. Similar reductions were made in Atlanta, Ga., and Louisville, Ky., as well as other cities.

A study of the colored mortality rates of cities and of the urban and rural populations of states shows that the colored death-rate is subject to influences which produce variations and that the rate is by no means fixed.

COMPARISONS WITH THE MORTALITY RATES OF FOREIGN COUNTRIES.

The colored death-rate in the United States was higher than the white death-rate in every registration area excepting where there was a difference in age distribution of the population or some other factor to explain a colored death-rate lower, or but slightly higher, than the white death-rate. From a study of the mortality records for the United States for the year 1913, or for a group of years, one might come to the conclusion that there was in the colored race some peculiar characteristic which caused it to have a death-rate higher than that for a white population similarly located. However, a comparison of the colored death-rate of the registration area with the death-rates of certain foreign countries and cities suggests that color and race are possibly not the most important factors in the production of the relatively high mortality rates of the colored population of the United States. The colored death-rate of the registration area of the United States for the year 1912 was

22.9. For the same year the mortality rate of Hungary, with practically no colored population, was 23.3. The mortality rate of Roumania was 22.9, that of Spain was 21.8, and of Austria, 20.5. The colored mortality rate of the registration area of the United States, therefore, compared favorably with that of the white populations of Hungary, Roumania, Spain, and Austria.

If one compares the rates for different periods, the present colored mortality rate of the United States registration area gains by the comparison. The colored death-rate of the registration area in 1913 was 21.9. For the period 1881-85, the average annual mortality rate of Hungary was 33.1, of Roumania, 26.2, of European Russia, 35.4, of Spain, 32.6, and of Austria, 30.1. The rural colored death-rate of the registration states, 17.7, is approximately half that of Austria, Spain, Russia, and Hungary during the period 1881-85.

Foreign countries.	1912.	Annual average 1881 to 1885.
Hungary	23.3	33.1
Roumania	22.9	26.2
Russia (European) ....	....	35.4
Spain	21.8	32.6
Austria	20.5	30.1

The colored death-rate for the registration area, 21.9, for the year 1913, compares favorably with that of St. Petersburg, 21.4, Moscow, 25, Budapest, 18.9, and Trieste, 21.8, for the same year. The colored death-rate

for the registration area, 22.9, for 1912, compares favorably with rates for the same year for Montreal of 20, St. Petersburg, 21.9, Moscow, 24.3 and Trieste, 21.1, all of which have had a marked reduction in mortality rates during the last thirty years.

Foreign cities and countries.	1913.	1912.	Annual average 1881 to 1885
Montreal.....	.....	20.0	31.0
St. Petersburg.....	21.4	21.9	32.9
Moscow.....	25.0	24.3	33.3
Breslau.....	.....	18.4	31.3
Munich.....	.....	14.7	30.4
Budapest.....	18.9	18.5	31.5
Trieste.....	21.8	21.1	31.1
Venice.....	.....	20.9	29.1

One is likely to feel gratified at the low colored death-rates in the registration area of 21.9 in 1913, and of 22.9 in 1912, when these are compared with the mortality rates twenty and thirty years ago for the city of Boston, which averaged 23.5 during the period 1891-95, and 24.7 for the period 1881-85, and of New York City, which averaged 23.6 for the period 1888-1897, and 25.3 for the period 1878-1887. There is some satisfaction also when comparison is made with the mortality rates of certain cities having practically no colored populations, such as Hartford, Conn., which had in 1913 a mortality rate of 18.2; Lewiston, Me., a mortality rate of 19.1; Portland, Me., 18.1; Chelsea, Mass., 21.3; Morristown, N. J., 22.2; New Brunswick, N. J., 22.7; and Albany, N. Y., 19.8, and if one uses for comparison the

rural colored death-rate of the registration states (17.7) one is still more impressed.

	1913.	1912.
Hartford, Conn.....	18.2	18.0
Lewiston, Me.....	19.1	20.3
Portland, Me.....	18.1	17.9
Cumberland, Md. (white) ..	18.7	17.3
Hagerstown, Md. (white) ..	18.5	18.1
Chelsea, Mass.....	21.3	18.4
Westfield town, Mass.....	18.6	19.4
Morristown, N. J.....	22.2	19.4
New Brunswick, N. J.....	22.7	20.9
Albany, N. Y.....	19.8	20.1
Lackawanna, N. Y.....	23.5	24.3
Troy, N. Y.....	18.1	19.7
Braddock, Pa.....	23.2	18.7
Shenandoah, Pa.....	18.9	20.2
Ashland, Wis.....	19.3	17.1

THE RESULTS OBTAINED BY A WHITE AND COLORED CLASSIFICATION OF MORTALITY RATES.

In considering the separation of deaths into those of white and colored, one must bear in mind the possibility that in many communities such a separation may amount to a classification according to industrial or economic status, the colored deaths being those in households having the smaller incomes. In this connection one is reminded that investigations into the rate of infant mortality and the relative prevalence of certain diseases, such as tuberculosis, have revealed that the infant mortality rate varied usually with the incomes of the population groups and that the relative prevalence of tuberculosis seemed to be largely determined by the same factor. It may be that if in the

average community deaths could be classified according to economic status, that is, according to the family or household income, a difference in the mortality rates would be obtained approximately as great as that resulting from a white and colored classification.

That a classification of deaths on a basis other than that of color may show differences in mortality rates fully as great as those produced by a white and colored classification is well known. An interesting illustration of this is one presented by Doctor Guilfooy (*Medical Record* of January 25, 1908):

"In New York City (the old city) for the year 1906 the death-rate among that part of the population of Irish nativity was 29.26 per 1,000; and among the population of Swedish nativity 11.21 per 1,000, while the death-rate of native born Americans was 18.49. Classified according to the nativity of the parents of the decedents, the death-rate among persons whose parents were born in Italy was 36.43 per 1,000, of those whose parents were born in Austria-Hungary, 23.4 per 1,000, and of those whose parents were born in Sweden, 10.97 per 1,000,

while of those whose parents were born in the United States the rate was 13.98 per 1,000. The death-rate of the colored population throughout the whole city (greater New York) was 27.16. These figures indicate that, in so far as crude death-rates are concerned, other groups of the population may have, and in New York City did have, higher rates than the colored population."

CONCLUSION.

In conclusion, it is believed that the comparison of mortality rates previously discussed shows: (1) That the colored death-rates of most communities of the United States are not discouragingly high; (2) that they are undoubtedly lower than they have been in the past; (3) that they are as low as many white population groups possessed twenty or thirty years ago, and are in fact as low as some white populations possess at the present time; and (4) that with the economic and industrial progress of the colored population its death-rate will gradually approach nearer to that of the white population.

Discussion.

J. S. FULTON, M. D., *Baltimore, Maryland*: Adequate discussion of Doctor Trask's paper would require a more critical study than I am able to make of his figures. I do not hesitate, however, to concur in his main conclusions. There is no reason to be discouraged about the greater mortality of the colored race. The negro shares in the decline of the general death-rate. In Maryland the decline of the tuberculosis mortality of the negroes seems to me particularly impressive. This decline is going on as in a much higher level and by smaller steps; but

it is a consistent decline and is not attributable to precisely the same factors which are commonly assumed in explanation of the declining tuberculosis mortality. The domestic prophylaxis furnished by the state reaches the negroes as well, approximately, as the whites. But the negroes have so small a share in the sanatorium and hospital resources of the state, that we cannot fairly ascribe any utility to these agencies in the case of the negro. This circumstance casts a doubt, perhaps, on the utility of hospitals and sanatoria, but it might as reasonably

be believed that with equal provision for both races, the tuberculosis mortality of the negroes would decline as fast or faster than that of the whites.

It is possible that the decline of the general death-rate in both races is due, in larger measure than we commonly assume, to general social and economic progress; and a gradual approximation of the two mortality curves is to be expected, and is occurring. I seriously doubt, however, that a near approach of the colored mortality to that of the white race will be recorded within a century. The negroes are unable to avail themselves of the resources of modern hygiene; and the whites do not make any special effort to apply these resources to the needs of the neediest portion of the country's population. If this were done, and it could easily be done, I have no doubt whatever that the decline of the negro mortality could be greatly accelerated. No better demonstration could possibly be made of the effectiveness of preventive medicine, and there is no part of the world where such a demonstration can be more readily undertaken.

For the negro, there is comfort in Doctor Trask's suggestion that their heavier mortality may not be due, in any measure, to inherent racial characteristics. It would be advantageous to the negro to believe that, and not

inconsistent with our certain knowledge. But I am inclined to believe that after all reasonable allowance is made for the social and economic disabilities of the race, we require some additional explanation of their higher mortality, and the assumption of defective racial adaptation is a convenient one, not easily disposed of.

The most significant racial migration of modern times has given us our negro population, and within the country the movement of colored population is to this day such as to make considerable demands upon the racial faculty of accommodation. I am inclined to believe that the negro, particularly under urban conditions, and particularly again in the states from which Doctor Trask's statistics are drawn, will continue for generations to suffer a higher mortality than the whites in spite of all that will be done by them, or for them, in the way of social and economic amelioration.

Eventually, we may believe that the selective death-rate will bring them, as it has brought other races, into a fairly stable adaptation to the conditions of life in this country, perhaps only slightly inferior to that of the white race.

But at the moment it does not appear certain that the negro is propagating a stock which, in the registration area at least, is at the same time stronger and more numerous.

THE PART PLAYED BY HOSPITALS IN THE CONTROL OF CONTAGIOUS DISEASES.

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Read before a General Session of the American Public Health Association, Rochester, N. Y., September 10, 1915.

THE part played by hospitals in the control of contagious diseases depends upon a number of factors. Of these, public sentiment is the most important and is not answerable to the health laws. The law can make the people act right, but it cannot make them think right. Public sentiment generally is opposed to admitting most of the cases of contagious diseases to special hospitals for their care. It approves the admission of those who cannot help themselves. The cause of this public sentiment is undoubtedly the lack of public education, and the general attitude of physicians towards contagious diseases. In Boston, where the public has been educated to the idea that hospital treatment is the best, and physicians are better acquainted with this kind of treatment, a very large percentage of the cases of this character developing in the community are sent to the hospitals. The physician's habit of speaking slurringly of the contagious disease hospitals or referring to them as pest houses does more to discourage sending patients to them than any other one thing.

People, very properly, still believe in the family physician, and, where it has to do with medical matters, he moulds public opinion. The medical sentiment of the community is the di-

rect reflection of the public utterances and beliefs of the doctors. Physicians should recognize this fact and be careful to so talk that their influence shall be helpful to public health education, and, thereby, indirectly teach parents the desirability of sending their children to the hospital when they contract contagious disease, instead of keeping them at home to infect other members of the family and act as a foci for the further spread of the disease through the community.

The Department of Health, or whatever the health authority is, should have the power to summarily remove cases of contagious disease to the hospital, in every instance where there is failure to comply with the health laws or danger of infection spreading to other persons. Some may believe that such a law would be abused; this is impossible, for every case should be isolated in a hospital under any circumstances, and the failure to enforce such laws would be on the side of leaving patients out of the hospitals, not sending them in.

Every community should have, what I believe every community now neglects, hospital accommodations enough to care for all non-quarantinable cases of contagious diseases. Without this, hospital control is inadequate to prevent epidemics, with it and

power to act there would never be an epidemic in a community in the accepted definition of the term, for as fast as cases developed they would be removed to the hospital and the epidemic condition as to the presence of the patients in the community would be confined to the four walls of the hospital.

The period of hospital quarantine influences the usefulness of the hospital in control of contagious diseases in the community a very great deal. If cases are held too short a time, then the discharged patients represent just so many carriers in the community until they are free from contagious disease organisms. In such instances returned cases are to be expected and will be found.

While no hard and fast rule can be laid down for the period of quarantine, experience has taught us that when cases were dismissed from the hospital with discharging noses or ears, or with any inflammatory condition of the mucous membranes that was due to the disease, they were still in a state of infectivity and were spreaders of disease. Experience has also shown us that the cessation of such inflammations and the infectivity of cases in scarlet fever is about coincident with the cessation of desquamation. So that while the desquamated material may not in itself be infectious, holding the cases until after desquamation has ceased is good practice and not without practical reasons.

I have had a map prepared showing the occurrences of contagious diseases in blocks in a certain district in New

York City by months during the year. Had these cases been removed to the hospital in January and February as rapidly as they occurred, I am certain that in April and May there would not have been any such number as this map shows. I have also prepared a chart showing the total number of cases reported in the city of New York from December 26, 1914 to July 3, 1915. It is here shown that in scarlet fever and diphtheria, where a very appreciable percentage, about one quarter, received hospital care, the number developing is far below that of measles where hospital care was given a very few, less than ten per cent.

I do not mean to claim that any attempt is made to control contagious diseases in New York City at the present time by placing them in hospitals, but there is no question that their spread is greatly influenced by the number sent into the hospital.

	Scarlet Fever.	Measles.	Diphtheria.
Reported . .	178	194	293
Admitted . .	38	16	83
Per cent. . .	21.38	8.24	28.3
Date, 1914.	Dec. 26	Dec. 26	Dec. 26
Reported . .	185	200	277
Admitted . .	36	19	82
Per cent. . .	19.45	9.5	29.6
Date, 1915.	Jan. 2	Jan. 2	Jan. 2
Reported . .	291	375	455
Admitted . .	44	22	67
Per cent. . .	15.1	5.8	14.7
Date, 1915.	Jan. 9	Jan. 9	Jan. 9

Control of Contagious Diseases

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	Scarlet Fever.	Measles.	Diphtheria.
Reported..	259	255	333
Admitted..	47	21	90
Per cent. . .	18.1	8.2	27
Date, 1915.	Jan. 16	Jan. 16	Jan. 16

Reported..	347	271	301
Admitted..	56	22	74
Per cent. . .	16.1	8.1	24.5
Date, 1915.	Jan. 23	Jan. 23	Jan. 23

Reported..	197	454	346
Admitted..	83	19	91
Per cent. . .	42.1	4.18	26.3
Date, 1915.	Jan. 30	Jan. 30	Jan. 30

Reported..	305	424	399
Admitted..	72	43	95
Per cent. . .	23.6	10.1	23.8
Date, 1915.	Feb. 6	Feb. 6	Feb. 6

Reported..	288	443	363
Admitted..	74	34	77
Per cent. . .	25.6	7.6	21.2
Date, 1915.	Feb. 13	Feb. 13	Feb. 13

Reported..	312	506	359
Admitted..	74	14	92
Per cent. . .	23.7	2.7	25.6
Date, 1915.	Feb. 20	Feb. 20	Feb. 20

Reported..	296	694	421
Admitted..	61	33	122
Per cent. . .	20.6	4.7	28.9
Date, 1915.	Feb. 27	Feb. 27	Feb. 27

Reported..	302	721	348
Admitted..	40	30	88
Per cent. . .	13.2	4.16	25.2
Date, 1915.	Mar. 6	Mar. 6	Mar. 6

Reported..	329	1008	388
Admitted..	67	49	92
Per cent. . .	20.3	4.8	23.7
Date, 1915.	Mar. 13	Mar. 13	Mar. 13

	Scarlet Fever.	Measles.	Diphtheria.
Reported..	381	1192	343
Admitted..	86	57	98
Per cent. . .	22.5	4.7	28.5
Date, 1915.	Mar. 20	Mar. 20	Mar. 20

Reported..	384	1344	364
Admitted..	84	63	95
Per cent. . .	21.8	4.6	26.
Date, 1915.	Mar. 27	Mar. 27	Mar. 27

Reported..	378	1371	310
Admitted..	103	64	83
Per cent. . .	27.2	4.6	26.7
Date, 1915.	April 3	April 3	April 3

Reported..	407	1619	255
Admitted..	89	37	63
Per cent. . .	21.8	2.2	24.7
Date, 1915.	April 10	April 10	April 10

Reported..	400	1758	330
Admitted..	108	80	95
Per cent. . .	27	4.5	28.7
Date, 1915.	April 17	April 17	April 17

Reported..	403	2061	366
Admitted..	103	91	96
Per cent. . .	25.5	4.4	26.2
Date, 1915.	April 24	April 24	April 24

Reported..	400	2163	317
Admitted..	93	95	91
Per cent. . .	23.2	4.3	28.7
Date, 1915.	May 1	May 1	May 1

Reported..	376	2404	323
Admitted..	90	108	91
Per cent. . .	23.9	4.4	28.1
Date, 1915.	May 8	May 8	May 8

Reported..	336	2214	370
Admitted..	76	86	91
Per cent. . .	22.6	3.8	24.5
Date, 1915.	May 15	May 15	May 15

	Scarlet Fever.	Measles.	Diphtheria.
Reported..	315	2204	296
Admitted..	68	90	73
Per cent. . .	21.5	4.08	24.6
Date, 1915.	May 22	May 22	May 22
Reported..	308	1964	297
Admitted..	77	66	72
Per cent. . .	25	3.3	24.2
Date, 1915.	May 29	May 29	May 29
Reported..	260	1977	377
Admitted..	61	112	86
Per cent. . .	23.4	5.9	22.8
Date, 1915.	June 5	June 5	June 5
Reported..	246	1878	356
Admitted..	86	91	66
Per cent. . .	24.9	4.8	18.5
Date, 1915.	June 12	June 12	June 12

	Scarlet Fever.	Measles.	Diphtheria.
Reported..	236	1783	362
Admitted..	73	103	82
Per cent. . .	30.9	5.7	22.6
Date, 1915.	June 19	June 19	June 19
Reported..	154	1412	342
Admitted..	62	102	53
Per cent. . .	40.2	7.2	15.4
Date, 1915.	June 26	June 26	June 26
Reported..	147	920	348
Admitted..	65	76	55
Per cent. . .	44.2	8.2	15.8
Date, 1915.	July 3	July 3	July 3



THE RELATION OF MORBIDITY AND MORTALITY TO WAGES.

Bernard Shaw, in "Major Barbara," emphasizes very clearly the relation of decent wages to decent living, health and mental and spiritual growth. Henry Ford has also made a demonstration of the good effects of proper wages upon honest workmen and upon ex-convicts. General Gorgas has enunciated, and proved at Panama, the principle that only by the economic elevation of the toiling masses may the largest results in health and life saving be achieved. Our Government's Children's Bureau at Washington has reported an average infant death-rate of 134 out of every 1,000 babies in a steel making and coal mining town, against a rate of 84 per 1,000 in a residential suburb. A great contrast was found between the most congested section and the choicest residential section in each of these two communities. The report lays down the law that "the more favorable the civic and family surroundings and the better the general conditions of life, the more clearly are they reflected in a lessened infant mortality." Excellent results have already followed in two com-

munities through the securing of infant welfare nurses, improving the milk supply and arousing community interest.

General Gorgas believes that a revolution in our system of land taxation, perhaps along the lines of the single tax, would "secure for all mankind natural wages." The syndicalists urge ownership of the means of production by the workers themselves. Other radical measures are proposed by various reformers. In the light of our present knowledge of the economic principles upon which health, longevity, happiness and efficiency depend, it is inevitable that great fundamental changes will occur unless the master class awake and see the writing upon the wall which warns them to give unto labor its fair share of the profits of industry before it is too late, and to mitigate the greed wherewith they are piling up fortunes wrung from the blood and sweat of the workers, fortunes which are the base equivalents of the lives and souls of fellow human beings.—*Medical Times, February.*

IS THE CONTROL OF MEASLES AND WHOOPING-COUGH PRACTICABLE?

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Read at a General Session of the American Public Health Association, Rochester, N. Y.,
September 10, 1915.

OF THE commoner acute communicable diseases, measles and whooping-cough probably give more trouble to boards of health and the methods of control which are attempted give less satisfactory results than in any other diseases.

There are several reasons for this, chief of which is the existence of a widespread belief that they are both comparatively mild and harmless diseases and that the sooner children have them and are done with them, the better it is for all concerned.

This belief, I regret to say, is held by not a few physicians and by a majority of the laity. Indeed, so deeply seated is it, that in some communities, when measles is present in a neighborhood, it is customary to have what are locally known as "measles teas," where the mothers get afternoon tea and the children get the measles.

It is not necessary to say how erroneous is the belief that either one of the diseases in question is harmless or that both may be followed by serious, even fatal sequelæ.

However, it may not be amiss to give briefly the comparative figures for the four diseases diphtheria, scarlet fever, measles and whooping-cough for 1913. In the Registration area the death-rates were as follows: diphtheria, 18.8;

scarlet fever, 8.7; measles, 12.8; whooping-cough, 10.0 per 100,000.

It is difficult to see how the belief in the harmlessness of these diseases arose; it may be due to the fact that formerly the death returns of many cases of broncho-pneumonia and other diseases following the two under consideration contained no mention of the antecedent disease to which they were due and consequently were not classified as deaths due to either. For this reason the annual mortality lists, by containing few deaths due to either measles or whooping-cough, conveyed an entirely erroneous impression.

With the more careful scrutiny of death returns and by the proper classification which is now usual, it may be hoped that this belief will gradually be diminished and a proper understanding of the gravity of the two diseases take its place.

Another cause of the difficulty in controlling these diseases is to be found in the very imperfect reports of their occurrence which are made.

Although in most states measles, at least, is and for many years, has been a reportable disease, it is hardly an exaggeration to say that, as a rule, not more than two thirds of the cases which occur in any given community are reported to the board of health.

If an outbreak occurs during the

school year and there is an efficient system of medical inspection of the school children, the percentage of cases discovered may be slightly higher, but if it occurs during the vacation season the number of cases reported falls far below the actual number occurring.

This is not necessarily due to carelessness on the part of the physicians, but simply to the fact that most mothers do not consider measles serious enough to require the services of a physician, or if one is called in to see the first case, his services are dispensed with almost as soon as he has made the diagnosis and any subsequent cases in the family are treated by the mother herself.

In whooping-cough the same thing obtains even to a greater degree, as most self-respecting families have a remedy for whooping-cough; an infallible remedy by means of which grandmother brought all her numerous family safely through the disease, and consequently it is a waste of money to call in a physician.

For these reasons, only a small proportion of the actual number of cases are known and reported to the board of health.

When we consider that early and accurate knowledge of the existence of any disease is a necessary preliminary to intelligent control it is easy to see how incomplete and faulty reports add to the difficulty.

A third reason is due to the nature of the diseases themselves and the difficulties in the way of early diagnosis.

Both diseases begin with the symptoms of a common cold and, in the

absence of any practical method of laboratory diagnosis that can be easily and quickly used, it often happens that the true diagnosis is delayed for several days, during which time the patient may be going about freely, often continuing attendance at school and, by the time the true diagnosis has been made, many others have been infected and the foundation of an outbreak laid.

All these reasons have a strong bearing upon the difficulty which boards of health experience in learning of the presence of either of these diseases in a community, and it is as a rule not until they are well established that the health department knows that they are present, and so what little advantage might arise from knowing of the first cases is lost.

One other thing which adds to the difficulty of control is the fact that the infectivity of measles is active for from three to four days before the appearance of the rash.

We have, therefore, the belief in the harmlessness of these diseases, imperfect reports of their occurrence, lack of a sure means of early diagnosis, and an infectious but unrecognized prodromal stage, all of which are active in preventing the taking of any protective measures early in their occurrence.

After they have once obtained a foothold in a community, the efforts of the board of health to control them are usually futile and they continue until all the susceptible material has been exhausted.

There are two methods used by boards of health in dealing with an outbreak of measles, but neither seems

to have much effect in controlling the spread.

In one method an attempt is made to establish a strict isolation, as is done with diphtheria and scarlet fever. A familiar example of this is the method used in Aberdeen in 1893. Again in England, an attempt was made to control measles by requesting reports from the teachers of all absentees, by careful isolation of all sick children, by the exclusion of the well children in the family from school during the continuance of the disease, by placarding the house and by terminal fumigation.

After fifteen years of faithful application of these methods, Doctor Davidson, M. H. O. of the district, stated that the conclusion was inevitable that none of them had the slightest effect in limiting the occurrence of the disease. He does state that the reports of absentees received from teachers were of value in leading to early discovery of secondary cases and saved a number of lives by bringing them under treatment earlier.

In Richmond, Doctor Levy thought that closing the school rooms where measles had occurred from the nineteenth to the fourteenth day after the appearance of the first case, might have had some effect in reducing the attack rate but it was impracticable on account of the disturbance of the school routine.

The writer does not believe that such a course would reduce the attack rate to any appreciable degree unless the non-immunes could be prevented from coming in contact with the sick, when out of school, which is of course impossible.

Under the other method of control, little or no attention is paid to the occurrence of measles, beyond recording the cases as reported and excluding from school the other children in the affected family as long as the disease is present.

Under this method, houses are not placarded and children are not prevented from going about freely; they are only excluded from school.

This method is a practical acknowledgment on the part of the board of health of its inability to do anything to limit the spread of these diseases, and is an example of the stand taken by most boards.

The question to be solved is how to exercise efficient control over two diseases which are considered harmless by the majority of persons, which are not properly reported and in which, under the most favorable conditions, the true diagnosis is often delayed for several days after infectivity is present.

The solution is difficult and it is not too much to say that, under present conditions, it is not practicable.

One reason for the failure of the first method of control is that it is very difficult to make the average human being take precautions against a disease which he believes will not do him any harm even if he gets it, and until the public realizes that these diseases are serious, all efforts of boards of health to enforce any rigid system of isolation will be met with a passive resistance very difficult to overcome.

Boards of health must bend their energies to the effort to teach the public that these diseases are no more a necessary concomitant of childhood than

are diphtheria, scarlet fever or small-pox, and that children should be protected against the former as well as the latter. It will do no good to close the school or even a room because of the presence of measles among the children, but, as Doctor Levy has pointed out, it will accomplish something to instruct the teachers as to the period of incubation and have them exclude from school and refer to the school physician any children who seem to be developing a cold any time after the eighth day from the appearance of a case of measles in the school room.

As soon as the report of a case of measles is received, the school physician should be notified and the non-immune children of the family should be excluded at once. The immune children may be allowed to continue at school. This will tend to put a premium on getting the reports required by law, for once it is understood that the record of the case on file with a board of health is the only proof of immunity which will be accepted, parents will be more prone to call a physician or make the report themselves.

In my own city, where this rule has been in force for more than a year, we are getting results in more prompt and complete reports of both diseases. When parents are told that the oldest child, who expects to graduate from the high school in a short time, must perhaps lose several weeks, while the younger children are having the measles, and that the reason for this is that the physician neglected to report the case when it occurred several years ago, they are very apt to say something to the negligent physician.

It is easy to offer suggestions on paper but difficult to carry them out in actual work, and, until boards of health have eradicated the belief in the harmlessness of these diseases and until some certain method of early diagnosis is found which can be used for routine work, I believe that the control of measles and whooping-cough must be classed with some of the failures in public health work to which our president referred in his annual address, and that the answer to the question asked in the title to this paper must, for the present, be "No."

PUBLIC HEALTH PUBLICITY: THE ART OF STIMULATING AND FOCUSING PUBLIC OPINION.

EDWARD A. MOREE,

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II. Organizing for Health Publicity.

IN A paper read before the Rochester meeting of the American Public Health Association, the author of this series said that printer's ink is one of the greatest potential life-saving agents. This statement evoked much interesting newspaper comment. Among the most significant editorials on this subject was one in the *Augusta (Me.) Journal*, the first paragraph of which was as follows:

"More and more the responsibility of the press as an educational factor in and director of human affairs, is being recognized. The editor of any sort of newspaper who does not feel the grave duty of a pastoral leader, is unfit for his position. If his mind does not intellectually and instantly grasp the moral and human progress side of a question, he should climb out of the boat"

This editor intended evidently merely to point out to newspaper men an important relationship of the press to social service activity. While this relationship is not new, it has been recognized only recently by many newspaper men. Its recognition by editors places a reciprocal responsibility on social workers. Many social movements have failed to accomplish their aims as completely as possible because the reciprocity of this rela-

tionship has not been recognized by their leaders.

Not so many years ago it would have been a unique convention of public health workers or other leaders in social reform, that did not hear the opinion expressed by more than one speaker, that social reform was retarded chiefly by the indifference of the press. Recently, however, there has been a trend of thought in the other direction. Social reformers have come to realize, to some degree at least, that they are partly responsible for any apparent indifference of the press. Recognition of the newspaper man's point of view and of journalistic problems, both creative and mechanical, by social workers, has been, however, of comparatively recent development. Occasionally we now hear newspapers praised for their aid in social movements. Better still, though, we hear social workers exhort their fellows to a better understanding of publicity principles and a more useful knowledge of journalistic method.

GROWTH OF THE ADVERTISING SPIRIT.

This change in attitude has been coincident with the growth of the advertising idea and the improvement of advertising method in the mercantile world. The growth of American

advertising, which has made merchandising in this country the model for the whole world, has had a reflex in the social service field. It is true that that reflex has been slow in functioning. A child with an important reflex that functioned so tardily would be classed as subnormal, if not feeble-minded.

Newspaper men are quick to realize and appreciate efforts made to facilitate their interest in social service movements. This is evidenced by the following extracts from an editorial in the *Watertown (N. Y.) Herald*, following an active campaign for the organization of a mental hygiene clinic. It is important to note that this editorial was entirely unsolicited, and represents absolutely the editor's reaction to the work that was carried on in his city:

"Watertown was visited last week by an eminent alienist, an expert publicity agent and a capable social worker. The first was Dr. Paul Taddiken of the State Hospital at Ogdensburg, and his mission here was to conduct a mental clinic, an innovation for this city. George A. Hastings was the publicity man of the clinic. His title is executive secretary of the mental hygiene committee of the State Charities Aid Association, but his real work is to see that the people are informed of the clinics and that they come. He succeeded here. Some of those present at the clinic came on the advice of their physician, some were brought by relatives, some were looked up by the alienist upon advice of relatives, but a number of those presenting themselves

at the clinic had clippings from the papers with them. . . .

"The matter of publicity in medical matters is the second evolutionary epoch denoted by the success of the clinic. Nothing was secretive about the whole affair save that the business of each one who visited Doctor Taddiken was regarded as confidential. Publicity pays in matters of health. Each week this paper has carried plates of health hints issued by the State Health Department and the comment of readers has always been favorable. Dr. B. R. Wakeman, the local district sanitary supervisor, says that publicity is a fine thing for medical and sanitary matters. The day is past when physicians are to be regarded as magicians or sorcerers and the healing art is not regarded as a mystic cult. Prevention is now even greater than cure, is a new dictum, and the newspapers have aided in the prevention of disease by the space given to matters of vital interest to communities."

IMPORTANCE OF KNOWING THE PROBLEMS OF MAKING A NEWSPAPER.

The most important feature of this editorial for our present consideration is the fact that Mr. Hastings, who is so eloquently praised by the editor, is a former newspaper man and understands the newspaper man's point of view. Further than that, he knows so thoroughly the machinery of making newspapers that in his campaign he was not constantly making demands on the newspapers that they could not meet. On the contrary, he was supplying them with material in the form that they wished it; at the hours when

it would be most serviceable and doing it all with a complete understanding of space limitations which newspapers are obliged to enforce.

Later in this article and in this series, I expect to comment more extensively on the importance of requiring special training in printing and publicity of all heads of bureaus of publicity and education.

The point that should be forced home here is that publicity work does not mean the employment of a "press agent" of the old type; does not mean the seeking of free space that the newspapers reluctantly grant because of some more or less unwelcome pressure. It does mean, however, intelligent treatment of the facts at the disposal of public health and social service agencies by a man so trained in newspaper work that he can be in effect a reporter; who has, it is true, not been assigned to a particular job by any newspaper, but whose work is so valuable to all newspapers that they gratefully accept his services.

ORGANIZATION THE KEYNOTE OF PUBLICITY.

The most fundamental and important phase of mercantile publicity is organization. The work of putting a brand of baked beans in the mouths of ten millions of people is planned months in advance. Every important feature—the method of baking the beans, the size and shape of the container, the color and design of the wrapper, the field of appeal, the date of putting on the market and the time, kind and method of advertising—is gone over carefully by experts and

the whole campaign is reduced to 1, 2, 3, A, B and C sometimes months before a single can is produced.

To reach the highest point of publicity efficiency a public health campaign must be organized in practically the same way; certainly with as much attention to plan and scope.

The manufacturer finds his problem divided in three parts: first, the assembling of raw material and its manufacture; second, informing the public of its merits, and how, when and where to secure it; third, distributing it to an expectant and hungry public.

The State Department of Health and the state or national health association or other social service agency, on close examination will find its work divided in much the same manner.

First: It must gather its staff of expert workers and assemble its facts. These are the raw materials. It must select from innumerable possibilities those activities which meet the most pressing needs and which will produce the largest possible results for the smallest expenditure of money and effort. In other words, it must select the materials that will, in the manufactured state, be most acceptable to the people. It must also organize the facts at its disposal and harmonize the opinions of its experts (where harmony is possible), thus moulding the raw material into a composite and comprehensive program, which when ready for the public is the manufactured product.

Second: Having completed the manufacturing process, or having discovered its ability to produce a finished

article, our health department or lay organization must then map out its publicity campaign. It must get the public to adopt its program. To do this, the department must convince the public of the merits of its program and instruct the public collectively and as individuals in its application.

Even distribution, the third phase of the manufacturer's problem, finds its counterpart in the health department or social service organization in the work of conveying to the public or local officials the expert services of its laboratories and engineering divisions, through lectures, pamphlets, inspections, suggestions and advice. The social worker must "deliver the goods" actually as well as figuratively.

This series of articles has no concern with the first of these three phases. The series is dealing mainly with the second phase—that of advertising, and to a somewhat smaller degree, with distribution. These two parts of the work of any organization should have practically the same relationship as do the advertising and sales departments of the industrial plants. Some manufacturers make their advertising department part of their sales department. Probably, however, a close relationship between the two is more frequent than actual organic union.

PUBLICITY IS "EXTENSION WORK."

The manufacturer who finds it desirable to unite his publicity and sales department might very well term the union "extension" department or division. The duty of this division is to extend to the people within the

manufacturer's field, the knowledge of and desire for and the use of, his commodity.

The publicity work of a social service agency logically becomes a part, probably the main part, of an extension division. Every effort to engage the public's attention, instruct individuals or masses or to move them to action, falls within the scope of the extension division. Securing the coöperation and utilizing the interest of organizations is distinctly a part of extension work and probably comes closer to the kind of work done by extension divisions of universities. I am not trying to draw too close a parallel with extension work as it is now understood. I am merely trying to find a new word to describe a work that can be as thoroughly described by "publicity." There is so much misunderstanding of that word that departments may find it advantageous to adopt this new one.

Closely allied, often a part of the publicity work of this division, will be found the problem of distribution. The preparation of pamphlets, newspaper articles, lantern slides, motion picture reels, circular letters and weekly or monthly bulletins, is one side of the extension division's problem. The circulation of these so that they benefit the people they were created for, is also an important part of a department's publicity work. Selecting lists and organizing them, mapping out lecture tours, circulating lantern slides and pamphlets, letters and newspaper articles, are all matters requiring close study and careful attention to details. Too often these matters are left to in-

experienced clerks with a vision confined by the four walls of their offices, and with little interest in, or knowledge of, the field of the organization's work. A clerk with no field experience is inclined to dismiss many of these highly important matters with a perfunctory letter or a telephone call to an express company.

A pamphlet may be the very best thing of its kind, but if it fails to reach its public in just the right way, at just the right time, it will lose some part of its value. An exhibit may carry important information but will be of small value if it is shown to small crowds, or if it is circulated about its territory without intelligent attention being given to time (holidays, special local events), kind of halls (light, heat, ventilation), neatness and a hundred and one other points. These are all just as important in their way as are the selection and organization of exhibit material and insuring crowds through wise publicity.

Another highly important function of the extension division is that of pulse register. The head of the division should consider it his duty to keep in touch with public opinion. The careful reading of newspaper clippings and the important newspapers in the organization's field, should be one of his daily tasks. Attention to this detail will not only show him how his organization is getting on with its public, but will also suggest many new lines of attack, especially in the publicity field.

THE HEALTH DEPARTMENT IS A RESERVOIR OF INFORMATION.

The department or association is a reservoir of information. The quality of this information, its gathering and storage, its purification and protection from pollution, is the first concern of every wise department, just as attention to the same factors is the first concern of a board of water supply.

Probably the next most important concern of the water department is distribution. A health department that devotes itself merely to the gathering and storage of a pure supply of information, with very little concern in its distribution, fails as disastrously as would a water department that was similarly shortsighted. The distribution of a water supply involves engineering problems that are utterly dissimilar from those inherent in its gathering and storage. Likewise, the distribution of public health information involves special problems, for the solution of which special training and skill are necessary.

Having insured an adequate and pure supply of information the wise health department will then apply itself just as assiduously to the problem of distribution. For this work it will employ a publicity engineer. To tap the reservoir of technical information and scientific fact and to run the publicity pipe lines about the state or county, or even the city, so that the supply will reach the greatest possible number with the least possible expenditure of effort, requires a skill akin to that of an engineer.

A municipality employing an engi-

neer for its water supply will inquire first as to his technical engineering knowledge. If they can secure a man who possesses, in addition to engineering knowledge, a skill in and appreciation of the fine arts, a knowledge of medicine and an interest in architecture, their selection would grace his office with a rare and interesting personality.

WANTED: A PUBLICITY ENGINEER.

A competent head of an extension division is a competent publicity engineer—and nothing else should be required. He possesses a knowledge of the machinery of publicity and an experience in its use. If he happens to have a knowledge of medicine or an interest in, or knowledge of, other fields of social activity, he would probably be a broader-minded employee, with a more fluent comprehension of the social significance of his work. It is as serious a mistake, however, to emphasize medical training in choosing the head of an extension division, as it would be to require a water department engineer to be a bacteriologist. The possession of technical expertness in one line usually means its absence or subordination in other lines. That is the reason why few lawyers and few physicians succeed well as publicity engineers. There are some physicians who are good press agents: many are entertaining writers of popular literature. In most of these cases, however, they are successful in this field because they have almost entirely neglected the practice of medicine.

Ability to write fluently popular

articles on medical topics is not *per se* publicity ability. Such ability is important, but the publicity division of a health department is not a journalistic vaudeville show nor should it try to compete with the sob departments of the yellow journals.

In the early days of social work, as distinguished for a moment from public health work, boards of managers usually chose for executive positions superannuated ministers, school teachers who had failed as teachers, or interesting ladies who had acquired a reputation for concerning themselves with other people's affairs. There is little of this, however, in social work of the present day. Trustees are now usually successful business men and women of considerable experience in public affairs. They recognize the fundamental principle of modern efficiency — specialization. They seek clergymen where church experience is needed; they seek physicians where special knowledge of medicine is needed, but where the problem is stimulating interest, focussing public opinion and moving individuals or masses to action, they seek publicity engineers. Much the same change of attitude is taking place among public health leaders, but progress must be more rapid than it has been in the past if anything like real publicity efficiency is to be achieved.

TWO PUBLICITY FACTORS.

Public health publicity involves two main factors—scientific accuracy and effective presentation. This is true not merely of printed literature but also of lectures, exhibits, lantern slides and

motion pictures. We are all familiar, some of us sadly familiar, with departmental and other health literature that is scientifically accurate, that could be weighed in a technical balance and found not wanting, but that is of little practical value because of ineffective printing and poor editing. The preparation of literature is distinctly in the field of the extension division. Familiarity with the terminology of health work is, of course, necessary in the editing of such literature. This familiarity can be attained, however, without the technical training of a physician. A man with enough news sense and the other necessary qualities will acquire a working familiarity with terminology in a short time.

But, it will be said, admitting all this to be true, how are we to overcome the disadvantage of the extension division becoming so isolated from the every-day problems of the department and getting so out of touch with the affairs of the various other branches of the work, that it will be unable to apply this highly developed publicity engineering skill that you are emphasizing so earnestly?

In the first place, publicity ideas are not autogenetic. Only a brain made fecund by publicity experience, by much training in stimulating public opinion, can produce publicity ideas. Contact with workers, consciously sought, will fertilize such a brain, and the generation of ideas will result. Publicity fecundity, however, is fundamentally essential. Therefore, admitting wisdom in the choice of the publicity worker, all that the department must supply is the opportunity

for fertilization. Many times publicity experiments have failed because the department was sterile. That is another way of saying that you can't produce the goods unless you have the right kind of raw materials.

Let us examine this process of psychological fertilization for the generation of ideas by considering a practical health department problem.

A PRACTICAL PROBLEM.

A field worker, inspector, public health nurse or head of a division, discovers the need for a pamphlet or a series of pamphlets on rural hygiene. This need is communicated to the head of the department. It is a request for a new publicity pipe line. The head of the department calls into consultation his publicity engineer, the chief of the engineering division and others who may contribute technical knowledge. We must remember that the publicity engineer not only possesses knowledge of the machinery of publicity, but also experience in handling it and in gauging public opinion. He not merely knows what to do, but he knows when to do it and how to do it with the least possibility of undesirable reaction. So his advice is wisely sought in the very first conferences on the need for the rural hygiene pamphlet.

The department head lays out the problem. The rural death-rate as compared with the urban death-rate is far too high. Among the mass of factors which contribute to this undesirable situation are indifference; lack of modern toilet facilities; ignorance of and indifference to quaran-

time regulations; ignorance of the causes of communicable diseases and failure to apply the means of preventing them; inefficient inspection of school children and low standards generally among the medical profession of the rural districts.

To the head of the engineering division is allotted the duty of planning, first, outdoor sanitary toilets of cheap construction; second, sewage disposal plants that are practical on the farm; third, a cheap and efficient household water supply system. To the one who concerns himself with medical inspection is allotted the duty of developing standards for rural school inspection or reducing such as already exist to more easily available forms. To the head of the division of communicable diseases is allotted the duty of gathering all the information that a layman should possess to protect his family and neighbors from the danger of contracting disease.

SOME POINTS TO CONSIDER.

When the facts that are being gathered by the technical experts of the department become available, the publicity engineer must decide, in collaboration with the heads of other divisions of the work, which are the most important, which are the most easily assimilated by the layman and which will lend themselves to the most attention-compelling presentation.

Having decided each one of these questions in its relation to printed literature, exhibits, lectures, lantern slides and possibly motion pictures, he sets about preparing his publicity material.

The first principle that he applies is this: do not try to say at one time, in one place, everything that can be said on any given subject. A chart in an exhibit, with twenty words and a picture, may have more thought-compelling force, and probably will have, than a ten-page pamphlet on the same subject. A 2 x 4 card, to be distributed among the school children and by them taken to their parents, will stimulate more interest in the evil effects of hypertrophied tonsils and adenoids and secure more remedial attention than an extensive treatise, even though it be scientifically correct. A half-column article in a newspaper will be read by more people than a page article. Numbers reached, and not the volume of material sent out, should be the important consideration. *And in doing it right from a publicity point of view there need be no sacrifice of accuracy. Indeed, doing it right means that accuracy must be preserved at all points.*

All of the literature and other publicity material is carefully gone over by the technical experts of the department, after it has taken form. They will, however, wisely concern themselves with scientific accuracy and leave the question of type display, method of distribution and other publicity engineering problems, with the extension director.

TYPE DISPLAY AN ART.

Especially should it be remembered that type display is an art. It is an art than can be acquired only by training in the editing of publications and in dealing with concrete printing

problems. The man who writes headlines moulds public opinion. The principles of type display, whether in magazines, pamphlets, newspaper headlines or newspaper advertising, are essentially the same. Effective use of type, however, is not an art that can be reduced to rules. It is the application of established principles of the psychology of printing—plus temperament.

After selecting that part of his material that is suitable for exhibit use, he turns it over in the form of memoranda and rough drafts of charts and models, to the photographer, sign painter and carpenter.

In collaboration with the medical men and other technical experts in the department, the head of the extension division writes his lectures for use by laymen, and provides outlines and lists of lantern slides for use by the more technically trained field agents of the department.

With this material prepared or well under way, the extension division must now face the problem of distribution.

The director in examining examines his field, finds a farmers' organization that numbers among its members most of the progressive residents of the rural districts. He then seeks other organizations already at work in the rural field, and finds that the Department of Agriculture, through its extension division, has already organized farmers' institutes. He finds that church organizations are devoting an ever increasing amount of attention to the rural church problem. He finds that the Y. M. C. A. has

organized county branches and is gathering young men of the community into readily accessible groups. He also learns that people in large numbers can be reached through the fairs that are held in nearly every county.

Each one of these separate groups is a community, individuals of which can be reached by a single publicity pipe line. The problem of distribution, therefore, is much simplified. The grange has lists of officers, the churches and Y. M. C. A.'s and the Department of Agriculture have valuable lists of leaders. Diplomatically approached, these leaders, and leaders in other lines of social activity, may become valuable aids in any effort to reach the rural residents with health information.

DEVELOPING INTEREST.

The head of the division organizes his mailing lists with great care. He is especially careful to eliminate duplicates. He selects for his first efforts only those individuals or organizations that, by reason of their special interests, are most likely to respond to his appeal. Then with much care, and with much boiling down, he prepares his one or two-page circular letter.

These first letters are merely to develop initial interest in the efforts of the department. They are not argumentative but appealing. They aim to secure prospects and not absolute converts. They are the entering wedge—the diplomatic first approach. Having aroused interest and secured a list of prospects, who

will permit an exhibit to be shown at a fair, who will distribute literature at a grange meeting, who will put a lecture on the program at a grange rally or a farmers' or teachers' institute, he so organizes affairs at his command that the interest of each individual responding to his first appeal will have no opportunity to flag while waiting for the department to deliver the goods that it has promised. Nothing is more chilling to volunteer interest than slow response on the part of the agency stimulating that interest. Coöperation is a much used and much abused word. Many departments and social service agencies fail to realize that the state of coöperation is a reciprocal state.

If the preparation of literature is largely within the field of the extension division, their circulation is absolutely within its scope. Thousands of dollars are wasted every year by departments and lay organizations, through the non-use, or ineffective use, of printed matter. The preparation and organization of lists is one of the most important functions of the extension division. Haphazard and ineffective methods prevail when the circulation of literature is left to individuals or divisions other than the one that was organized for the purpose of reaching the public with facts.

A group that receives a pamphlet today on child hygiene, and one tomorrow on sanitary toilets, and one the day following on the fly menace, will scarcely be in a receptive mood to a suggestion that supervisors be

urged to vote for the county tuberculosis hospital.

PUBLICITY EFFORTS SHOULD BE WELL TIMED.

Timeliness is one of the most important of the many factors that enter into the problem of distribution of literature. This is scarcely secondary to the necessity for considering carefully the kinds of information and the methods of presentation which will appeal to particular groups.

The New York State Department of Health, adopting a method which had been used successfully in other states, decided to communicate with mothers within a few weeks following the birth of their children, as recorded in the Division of Vital Statistics. To do this it prepared an authoritative pamphlet on prenatal care and the care of babies. This is sent to mothers when they are most interested in the information it contains. Every mother in the state receives it a few weeks after the birth of her child. Enclosed with the pamphlet is a short but sympathetic letter from the State Commissioner of Health. The effectiveness of this timely, direct and personal appeal is well illustrated by the following story:

One of the supervising nurses of the State Department of Health, working in a remote rural district, was advised by one of the residents of the section to call on a certain woman who, she said, was feeble-minded and had a young baby. The husband of the woman was also said to be feeble-minded.

The nurse called and inquired about the baby.

"Oh, she's doin' fine," said the mother, "I'm bringing her up by a book. Mrs. Brown says it's no way to bring up a baby by a book. She says she's had eight babies and she never brought 'em up by no book. I axed her how many of her babies was dead. She said 'four.' So I said 'Look 'er now. What did I tell yer? Half of 'em died.'"

Then the mother inquired, "Did you ever hear of that Hermann Biggs?"

The nurse assured her that she had.

"Well," said the mother, "He's wrote a book all about bringing up babies, and he sent it to me and wrote me a nice letter too, and I'm goin' to bring up my baby by that book."

The routing of a motion picture reel, an exhibit or a lecturer, to avoid unnecessary traveling and wasteful expenditure for transportation, requires careful planning and close supervision. The extension division is not merely a publicity department—it is a printing bureau, a carpenter shop, a photographic studio, a scenario producing agency and a lecture bureau.

IMPORTANCE OF NEWS SENSE.

As the subject of newspaper publicity will be considered more fully in a later article, it will suffice here to show that the head of the extension division should be either a newspaper man or a man with a news sense and a knowledge of newspaper practice. Occasionally one finds a man with newspaper instinct but without the

technical newspaper training. News instinct is absolutely essential. Newspaper training is highly desirable. A large department or a lay organization with an extension program requires almost continuously the services of a reporter. The taxpayers have a right to know what the department is doing; the volunteer organization owes a duty to the public almost as definite. The people *must* have information if the department or the organization is to function adequately and if it is to receive public support for its appropriations and regulations and, in the case of the volunteer organization, support for measures it advocates.

Regular newspaper men are absolutely unable to cover all possibilities in their news fields. The department or organization that provides special facilities for getting news to the papers reaches the people the most frequently and most effectively with the news of its work. If a newspaper had a reporter with special interest in, or knowledge of, public health, that man would be assigned to cover the health activities of the community, the health department and the lay organizations. If the work of the publicity man commends itself to the newspapers; if he gives them the news of the agency he represents; if he gets it to the papers at the right time and in a form that is available, he becomes, potentially, the representative of every paper in his territory, assigned to cover the department or organization employing him.

Form is highly important in the presentation of news to newspaper

HEALTH NEWS SERVICE

Division of Publicity and Education
State Department of Health

TO THE EDITOR: The accuracy of the matter herewith submitted for free publication is vouched for by the
State Department of Health.

BERNARD M. BIGGS, M. D.
Commissioner

Released for publication Monday, Jan. 17.

STATE SAVES 4,500 LIVES.

- O -

Department of Health Announces Lowest Death Rate in
History of the State. - - Rate Outside New York City Lower than
That in Metropolis for First Time in Many Years.

- O -

Bigge Promises to Save 25,000 Lives in Five Years.

Albany Jan. 16.- A saving of 4,500 lives last year
outside of New York City is indicated by figures made public by the
State Department of Health. The death rate for that area over which
the State Department has jurisdiction are .9 per thousand lower in
1915 than the rate for the same area in 1913, the year before the
reorganization of the State Department of Health.

Computed on a basis of 5,000,000 population, which
is approximately the population of the State outside of New York City,
this means that there were 4,500 fewer deaths last year than there
would have been if the rate for 1913 had prevailed.

The State Department of Health makes public a summary
of returns of births and deaths for the State for 1915. The returns
are compiled and corrected for a series of years on the new estimate
of population as furnished to the Department by the Hon. Sen. L. Rogers,
Director of the U.S. Census Bureau on January 7th, 1916.

The Total Deaths in the State for 1915 were 145,682, giving
a death rate of 15.0. This is the lowest authentic death rate that
has ever occurred in the history of New York State.

The rate for New York City as computed on the new estimate
of population is 15.1 as compared with 15. for 1913 and 1914, and 14.9
for 1912 or .2 point higher than in 1912. The rate for the State
outside of New York City was 14.9 as compared with 15.2 for 1914 and
15.8 for 1913 - a reduction of .9 of a point on the rate of 1913. The
average death rate for the three years preceding 1913 was 15.9 - or
exactly one point above the rate for 1915. The .9 reduction this
year over 1913 (the last year before the reorganization of the State
Department of Health) computed on a population outside of N.Y. City
of approximately 5,000,000 means a reduction of deaths actually
occurring of 4500. Thus the promise of the Commissioner of Health
that with proper support he would save 25,000 lives in N.Y. State
outside N.Y. City in 5 years seems near realization, the country and
all villages under 8,000 being classed as rural. For the first time
in many years the death rates in the State as a whole and in the
State outside N.Y. City are lower than that for New York City.
Previously for a number of years the rate in N.Y. City has been lower

FORM OF PUBLICITY MATERIAL IS IMPORTANT.

On the right is a memorandum prepared by the New York State Department of Health merely for the purpose of summarizing the most interesting facts in the table of vital statistics for the year 1915. This memorandum was prepared merely to form a basis upon which to construct a news story. By mistake the memorandum, in the form shown above on the right, was sent to the newspapers in New York City. Not one of the papers, so far as the author knows, made any reference to the article, although a letter went with the memorandum indicating that it came from the State Department of Health. Later the article on the left was prepared. It will be noted that this differs from the article on the right in the following particulars: it states clearly at the very beginning where it comes from, thus establishing authority; it has a definite release date which is highly important, as it indicates clearly that the matter is news; it has a headline which tells briefly the most important facts in the article and which may be used by any paper whose headline style will permit; it has a date line; the first paragraph gives the meat of the story. There are no facts in the story on the left that are not contained in the story on the right. The one on the left was used in practically every paper of importance in New York State and every paper in New York City used it, although they had previously failed to use the same story supplied to them in another form.

men. Long experience has educated them to expect important news in a certain form. Any great deviation from that form prejudices the newspaper man against the proffered material. The lack of a headline or the lack of a release date may mean, and actually has meant in my own experience, the difference between wide use and practically no use at all.

The head of the extension division should be a reporter, then, on the work of his department or organization. Not only should he have news sense, but he should know in what form the newspapers prefer to have the facts presented to them. Such a division under the proper leadership educates not merely the people but also educates the press by stimulating its interest.

SIZE OF EXTENSION DIVISION.

As has been pointed out in several places in this article, practically every point made applies with equal force to official state departments, both state and local, and at the same time to the lay volunteer coöperating associations. The extension division of a state department may properly be a bureau with a director and numerous assistants, the number of the staff and the office equipment depending, of course, upon the extent of the department's work and the extent of the field to be covered. On the other hand, for a city department the extension division may be adequate and consist of one or two men with a stenographer and machinery for duplicating letters and press material. The logical place for a staff of lecturers is in the extension division. Certainly the lecture work should be carried on in close coöperation with the publicity bureau. A lecture that is delivered to an audience of fifteen persons may become a most valuable force if the facts presented by the lecturer are displayed the next morning in newspapers that reach a million or more.

Extension of departmental effort and increase of appropriations for public health work is most decidedly the order of the day. If an increase of departmental work can be secured only upon the basis of public approval, and if public approval can be secured only through wise publicity, it logically follows that among the first things to be done is to build up an adequately equipped publicity division. I recognize, of course, that it will probably be unwise for any depart-

ment to exert the publicity forces at its command directly for appropriations. Establish health work in the public mind as an important state function, and needed appropriations will come from a willing legislature.

In seeking appropriations for health publicity care should be exerted to emphasize the real purpose of the publicity division, *i. e.*, to increase the department's authority with the people it is to benefit, and to increase the productivity of the other appropriations for the department's work. Many legislators are "gun-shy" of publicity. Some look upon it as having sinister political significance. If the issue is squarely presented, however, no reasonable legislator can take exception to building up a publicity division along the lines here discussed.

While the publicity work of almost any lay volunteer organization could profitably be organized in the manner described herein, there is one phase of the work of the volunteer organization which should be dealt with at this point—its relation to the official health agencies.

THE FUNCTION OF LAY HEALTH ASSOCIATIONS.

I have likened the department to a reservoir of information which is to be tapped by publicity pipe lines. The volunteer organization is the auxiliary high pressure system that supplements the efforts of the official department and that may be called into play in emergencies.

It is needless to say that this relationship can be maintained only

To the Citizens of Montgomery County:

The Supervisors of Montgomery County have done two things for which her intelligent, humane, and generous citizens ought to be truly grateful.

First. The one they have secured for the tuberculosis sufferers has received the highest commendation from the officials of the state. The men who know the conditions in every county, frankly say that no county in the state has a more or more appropriate situation.

Second. They have appropriated funds for the transformation of buildings already on the grounds and for additions and equipment which when completed, will put this county ahead of the best counties in the state in the case of tubercular patients.

The local committee on the prevention and cure of tuberculosis urges the supervisors to do these things for the sake of the unfortunate victims of this dread disease. It is impossible to over-estimate the importance of this work. Very often the victims of tuberculosis are the bread winners of the home. If they are laid aside, the home is immediately imperilled and demands are necessarily made upon the city or county for help. Few homes have the needed facilities to care for such patients, and very often their disease is a menace to other members of the household and of society. Every member of the local committee realizes that the work is so far and so well on the way.

The crucial point in the whole matter is now at hand. The successful failure of the whole plan and purpose for these great sufferers, depends upon the ability, fidelity and efficiency of the five governors who are to be named by the supervisors. The local committee believes that the good citizens of the county will agree with them in maintaining the position that no man has a right to be a member of this board of governors unless he is known to be deeply interested in the welfare of the patients of this institution, and is in thorough accord with this high humanitarian purpose. Whether such a man is an active partisan or simply a quiet citizen, should have nothing to do with the matter. It is not a question of politics but of efficiency.

That the people of the county may know just who the men and the women are who constitute this local committee, it has been deemed wise to publish their names and addresses. It will be seen at once that they are of different parties and creeds as well as business and occupations. They are, however, practically unanimous in declaring that the board of governors ought to consist only and wholly of men whose efficiency and fidelity are beyond question. Whether they are Democrats or Republicans or members of some other party ought to have no bearing in determining their selection. The cause they are to serve, namely, the welfare of the pitiful sufferers, is timely and nobly humanitarian, and not at all partisan. The committee has no doubt that they are the best men that can be secured for this noble service.

The members of this committee hope that the residents of the county who are in accord with or ward and secure his co-operation to this end. It is imperative that every citizen who is

AMSTERDAM COMMITTEE

Mr. Arthur Chalmers, President

Vice-President

Mr. Fred R. Greene

Mrs. Theodore Van Der Veer

Mr. Spencer Warnick

Bartlett, Miss Anna H.
Barnes, Mrs. Jno. S. Jackson St.
Blood, Miss Joe R. 110 Division St.
Brook, Dr. E. F. 27 Division St.
Browne, Rev. W. A. 156 E. Main St.
Canna, Dr. Richard R. 27 Market St.
Canoll, Rev. E. T. 8 Mohawk Place
Chalmers, Mrs. Arthur H. 253 Guy P.
Collier, Dr. E. J. 44 Division St.
Conant, Dr. J. B. 18 Grove St.
Conover, Hon. Seeley, 60 Spring St.
Cooper, Mrs. W. H. 19 Trinity Place
Davy, Mrs. Fred, 24 Brandt Place
Dealey, Hon. J. H. 102 Madison St.
Dean, F. S. 270 Guy P.
DeGraff, Mrs. J. H.
Draxford, F. E.

THE PUBLIC HEALTH COMMITTEE MAY BE THE
HIGH PRESSURE SERVICE CALLED UPON IN
CASES OF EMERGENCY TO SUPPORT THE OFFICIAL
HEALTH ACTIVITY.

The above cut is a facsimile of a portion of a half-page newspaper advertisement published by the Tuberculosis Committee of the City of Amsterdam. This advertisement and other similar efforts by the committee succeeded in securing the appointment of a non-political Board of Managers for the hospital.

upon a basis of the fullest coöperation and the frankest possible understanding. Suspicion and jealousy have no place in such a relationship. Every lay organization has a place in the armamentarium of the department. Even organizations whose main purposes are far removed from health work may frequently be drawn into health campaigns of one kind or another, and usually render valuable service. The value of this service is largely dependent upon the effectiveness of the department's efforts to secure and to apply the interest of such organizations.

If this is true of lay organizations, more or less removed from direct interest in the department's work,

it is a thousand times true of the organizations directly interested in one or more phases of health work.

Governor Charles S. Whitman devoted a considerable portion of an address before the New York State Tuberculosis Conference and the North Atlantic States Tuberculosis Conference in Albany, to a discussion of this phase of the tuberculosis movement. In this address he said:

"A few years ago little was done by either state or local authorities or private philanthropy for the care or treatment or prevention of tuberculosis. Now the state, the cities, the counties, and even some of the towns and villages are actively at work. Furthermore, the medical profession,

the nursing profession, the State Grange with its membership of over 100,000 men and women, the State Federation of Women's Clubs and the State Federation of Labor—all devoted to what pertains to the health and welfare of the people at home and at work—and a number of fraternal organizations, these are assisting effectively in the movement. The state has its own hospital for incipient cases at Ray Brook in the Adirondacks, and performs certain duties through the State Department of Health. Many of the counties have tuberculosis hospitals established or in the course of construction. Any large locality which has not its tuberculosis visiting nurse is considered exceptionally backward. Many cities have free tuberculosis clinics or dispensaries for diagnosis and supervision."

In another part of his address he touched upon the same theme:

"It is gratifying that so large a part has been taken in the tuberculosis movement by interested citizens and lay organizations. We need these local associations and societies to hold the local authorities to a high sense of duty and to furnish the stimulus for securing the funds with which to carry on the work."

The Governor concluded his refer-

ence to this important phase of the tuberculosis movement as follows:

"The tuberculosis crusade in this state is a happy example of effective coöperation between public authorities and private organizations. It has been carried on for nearly a decade without misunderstandings or jealousies, with almost perfect coöperation and with results that have placed this state in the front rank. Incidentally, a happy result of this long-continued effective coöperation is that the strength and efficiency of all parties concerned has greatly increased thereby. The skill and success with which a coöperative understanding was secured and has been maintained between public authority and private initiative in the tuberculosis campaign, should long serve as an example and an inspiration for similar coöperative effort in many other lines of social betterment and human welfare. This is true not only of the state as a whole but also of the various cities, counties and towns."

The condition of "effective coöperation" which the Governor so earnestly commends can best be secured through the extension work of a department of health, and, on the part of the lay organization, through an adequately equipped publicity service.

Book Reviews.

A Report on State Public Health Work Based on a Survey of State Boards of Health. Charles J. Chapin. *American Medical Association, Chicago.*

The Council on Health and Public Instruction of the American Medical Association in the fall of 1913 invited Dr. C. V. Chapin to undertake a comprehensive survey of the activities of state boards of health throughout the United States. Doctor Chapin's report has just been published by the Association as a volume of over 200 closely printed pages. Its appearance at this time has a peculiar interest in view of the recent death of Dr. Henry B. Favill, chairman of the Council; for this report is the last fruit of a life full of far sighted and constructive planning for the public good.

As Doctor Chapin says, "Progress in public health work is accelerating and there is much to inspire a hope that it will be still more rapid in the future. To have vastly improved public water supplies, to have made the diagnostic laboratory accessible to all physicians, to have supplied sera and vaccines to those who need them, to have rapidly initiated, or improved, means for recording vital statistics, to have developed comprehensive plans of public health education, stand to the credit of many states during the last few years." Yet no states have reached perfection in public health work and most are still sadly deficient, although rapidly becoming conscious of their shortcomings. The time was ripe for a careful comparative study of what has been done, and a mapping out of comprehensive ideals for future attainment. Such a study could be made only by personal visits to each department and by an analysis of the data in the light of broad knowledge, keen judgment and scientific open-mindedness. To those who know the health officer of Providence it need not be said that the present report fulfils all these requirements.

Doctor Chapin's report includes three different sections: first, a summary of the conditions and needs of each state, in detail; second, a discussion of the general functions of state departments in general; and third, tables of appropriations, classified activities, and a score card rating of the activities of each individual state along each particular line.

Taking up the more general questions first,—Doctor Chapin points out the malign influence of politics as the chief drawback to efficient public health administration. As the best means of eliminating this influence, he advocates an unpaid board of health with the power of framing ordinances and of appointing an executive officer who should have entire control of administration. There can probably be no doubt as to the superiority of this combination of a responsible executive with a quasi-legislative board or council over any other plan; but the reviewer is sufficiently optimistic to believe that with the rapidly rising standards of our public life the appointment of the health commissioner by the governor of the state may yet prove the best method of selection of the executive officer. The commissioner should be a full-time trained sanitarian and should receive, except in the smallest states, a salary of \$5,000 to \$6,000.

The specific activities of state departments are discussed by Doctor Chapin in detail, and the progress revealed is encouraging in the extreme. As he puts it, "The old conception of a state board of health as a body of estimable medical gentlemen with some special interest in communicable diseases, who, without pay, would consent to advise the legislature on public health matters and write voluminous reports dealing in glittering generalities, has generally become obsolete." Highly trained experts along many different lines are required for efficient modern health administration. Doctor Chapin discusses in detail Communicable Diseases, Vital Statistics, Child Hygiene, Public Health Education, Food, Engineering, and miscellaneous duties. In connection with communicable diseases he discusses what the state may do to improve morbidity reporting, pays a deserved tribute to the excellent epidemiologic work of Minnesota and urges that all states but the very smallest should employ full-time expert epidemiologists. An important section outlines the proper relation between the state laboratory and the state university. Under vital statistics he points out that while twenty-five states are

included in the Registration Area for deaths, not more than fifteen states at the outside register 90 per cent. of their births. The work of New York is mentioned as by far the best contribution yet made to the state control of child hygiene.

Public health education is discussed at length and the systematic development of work along this line is strongly urged. The Virginia bulletins are justly commended as models of health literature. Doctor Chapin points out, in connection with food supply, that while the control of adulteration is of small sanitary significance and the attempt to secure clean food often a misdirected one, the protection of milk supplies which is vitally important and possible of attainment has in no case been satisfactorily handled by state authorities on account of the crippling influence of the farmer vote.

Under engineering special mention is made of the Ohio and Wisconsin laws, which not only provide for approval of plans but for the ordering of changes in existing conditions with the safeguard of an appeal to expert arbitrators.

The most vexing problem in the whole field of public health is that of securing efficient sanitary administration in the rural districts. Doctor Chapin reviews the various means suggested for securing this end, ranging from merely educational efforts (schools for health officers) through partial control of appointments and supervision by district supervisors to the complete centralization of power in the state, which is seen in Florida and Pennsylvania. Doctor Chapin,—as the reviewer believes, wisely,—doubts the wisdom of extreme centralization and appears to favor the system of district supervisors or county health officers, although he evidently considers that the best plan remains to be worked out and must differ in different states with local conditions. As he says, "It is fortunate that the nation consists of forty-eight commonwealths in which different experiments can be tried."

Doctor Chapin's review of the condition of public health work in each individual state should prove of even more direct value than his general survey of the field as a whole. The variations are enormous; from New Mexico, which does nothing, and states like Arizona and Wyoming, which do next to nothing, to states like Florida and Pennsylvania which do much; from anomalous

lies of sanitary organization, like Alabama, where the State Medical Association constitutes the State Board of Health, to New York, which Doctor Chapin says "is fortunate in having a department of health not built up haphazard, but carefully planned by able men versed in sanitary affairs." In each case Doctor Chapin sums up what has been accomplished and indicates the future health needs of the state; and in a number of states with which the reviewer is personally familiar he has seized on the essential features of the local situation with unerring keenness.

The attainment of the future ideals of state health departments should be materially aided by the tables, and particularly by the score card rating at the end of Doctor Chapin's report. Per capita expenditures for health purposes (excluding state tuberculosis sanatoria) range from nothing in New Mexico to between 10 and 13 cents in Pennsylvania and Maryland and over 15 cents in Florida. Vermont, Nevada, Montana and Idaho spend between 5 and 10 cents; Massachusetts, Louisiana, New Hampshire, New Jersey, and Delaware between 4 and 5; California, Arizona, Minnesota and Rhode Island between 3 and 4 cents, and the great bulk of the states between 1 and 3 cents.

The rating sheet or score card is one of the most significant and valuable features of the whole report. It attempts to score merely the functions actually performed, and not of course the intangible quality of the performance. There will no doubt be dissent from some of the ratings given, but on the whole the reviewer believes that they very fairly represent the general condition of state public health work in 1915.

In the total score, Massachusetts leads with 745, out of a possible 1,000; New York comes next with 730, and Pennsylvania third with 716. Then there is a drop to a group of nine states—Minnesota (574), New Jersey (555), Indiana (526), Maryland (507), Kansas (499), Vermont (486), Ohio (462), Rhode Island (432), and North Carolina (411), whose scores lie between 600 and 400, Virginia being just below at 397. Nine states—California, Connecticut, Illinois, Kentucky, Louisiana, Michigan, New Hampshire, Virginia, and Wisconsin—fall between 300 and 400; seven states—Florida, Iowa, Maine, Mississippi, Montana, Oregon, and Washington—between 200 and 300; thirteen states—Alabama,

California, Delaware, Georgia, Idaho, Missouri, North Dakota, South Carolina, South Dakota, Tennessee, Texas, Utah, and West Virginia—between 100 and 200; and seven states—Arizona, Arkansas, Nebraska, Nevada, New Mexico, Oklahoma, and Wyoming—score less than 100.

This table of detailed scores for each division of each department in connection with the dis-

cussions in the body of the report should prove of inestimable value to executives in securing the support necessary for the development of their departments along sane and effective lines. The report as a whole should mark a distinct turning point in American health administration.

C.-E. A. Winslow.

The Illumination of Joseph Keeler, Esq., or On to the Land. *Peter H. Bryce, M. A., M. D., Chief Medical Officer of the Department of the Interior. Canada. Pp. 97. Published by the American Journal of Public Health, Boston. Price, 50 cents.*

In this book the author depicts a number of interesting incidents of historical and economic importance connected with the settlement and development of rural upper Canada. He shows that while money and most of the accompaniments of modern life were extremely scarce, yet there was so much to fill in the lives of these early settlers that, as he makes one of his characters say, "they were indeed halcyon days!"

He shows how that up to 1861 practically all increase in the population had been in the rural districts, only approximately 7 per cent. at that time being in the cities, and how owing to a variety of causes, which the Doctor quotes facts and figures to explain, the population in 1911, although largely increased in the cities, had not increased and in fact had decreased in most of the rural towns. He shows that although the opportunities of acquiring wealth in the city are ordinarily greater, yet there are connected with city life disadvantages so great that one may well ask if it is not worth while for many to return to rural pursuits. To make it possible to do this the Doctor suggests better agricultural

methods, educating children along the lines of practical agriculture, rural credits, storage of products near the place of production, and marketing when called for, instead of as at present. He might well have added here, the untaxing of improvements as in western Canada.

He speaks of a development of a social life entirely possible in rural districts to offset the loss of similar things in the city. He does not neglect to point out the advantages of country life to many a person, the victim of or threatened by disease acquired in the closer settled districts, and that it provides opportunities for the employment of the most natural and wholesome impulses of man. Woven into the last chapters of the book is a pleasant love story.

The conditions in upper Canada are so nearly alike those of a large portion of the older settled sections of the United States that the book is well worth reading by all those who are considering the tendencies of the times for population to increase in the cities at the expense of the rural districts.

T. E. Bullard.

Health Department Reports and Notes.

REPORTS.

Hygienic Institute of La Salle, Peru and Oglesby, Illinois.

La Salle, Peru, and Oglesby are three small industrial communities of Illinois having a joint population of approximately 28,000, largely laboring people of foreign extraction. There has been the all too common case of defective health administration associated with scanty funds and lack of trained health officials. The vicious circle was broken in this case by a public-spirited citizen, Mr. F. W. Matthiessen, whose generous donation brought into being and maintenance a coöperative health department for the three communities, under the able direction of Dr. Gustav F. Ruediger. The present report covers the first and successful year ending April 30, 1915.

The members of the staff are appointed by the director, while the organization is legalized by the appointment, by the mayor and council in each city, of a resident assistant health officer. In effect there is thorough centralization of authority in the hands of the Director.

When the new régime began its work communicable disease was out of control and milk supplies were practically without supervision. Through energetic efforts directed particularly to the detection of mild and carrier cases epidemics of scarlet fever and diphtheria were suppressed, a thorough system of school medical inspection established, and sterilization of milk bottles required. Laboratory work was instituted. A system of adequate health office records was put in operation. The privy danger was taken up. Many ordinary nuisances were abated. Strenuous measures were taken against the widespread sale of "loose" milk. As an example of the extent to which resources enabled the Institute to go may be remarked in its offer to provide milkmen, free of charge, with all necessary apparatus for bottling milk under sanitary conditions and for properly washing, scalding, and steam-sterilizing the bottles. Progress was made against tuberculosis in dairy cows and in securing pasteurized supplies. Tuberculin-tests of about four hundred cows showed approximately 27 per cent. of reactors. The infant

welfare station, which was already in existence, was made a division of the Institute health department.

Dr. Edward H. Hatton, the bacteriologist, submits a detailed report on the laboratory work and a study of a diphtheria epidemic which apparently originated from a readmitted school-child convalescent who was still harboring the bacilli in his nose. Unusual mildness of the disease and length of persistence of bacilli in cases and carriers marked the epidemic, which involved twenty-nine pupils in one assembly room.

A noteworthy feature was the publicity, consisting mainly in public addresses before parents' meetings, women's clubs, and the high school, and in newspaper articles and letters. The latter, reprinted in full, are excellent examples of this simple and effective mode of publicity.

The report is interestingly illustrated and includes the general sanitary ordinance adopted at the inception of the Institute. The death-rates for the three communities are given as 16.08, 12.09, and 15.44. The statement of causes of death might properly be arranged according to the International Classification. The reader might also inquire as to the basis for the population estimates.

The La Salle-Peru-Oglesby organization is the second noteworthy example of the type of inter-community coöperation which was originated in 1913 in Wellesley, Mass., and neighboring towns, under the auspices of the Massachusetts Institute of Technology. An interesting comparison might be made between these two experiments which have demonstrated the practicability of such coöperation where suitable to local conditions. It should, however, be borne in mind that under the La Salle plan economy of operation has not been the paramount consideration. An efficient administration was the first object, but provision was also made for considerable research work. The present instance, in other words, partakes rather of the nature of a philanthropic foundation of a novel but valuable kind,

whereas one chief object of the Massachusetts Institute of Technology plan was to demonstrate the economy of high-grade administrative work when carried out under efficient coöperation. The funds of the La Salle Institute enable it to spend approximately 58 cents per capita per annum beyond the first cost of building and equipment.

The work of the Hygienic Institute is related to a general scheme of social coöperation which has been established among the three commu-

nities concerned, as described in an illustrated pamphlet entitled "The Social Center, Welfare and Community Work of the Tri-Cities, La Salle-Peru-Oglesby, Illinois." The present report, as well as Doctor Ruediger's paper on "Cooperation in Public Health Work by Neighboring Small Cities" (reprinted from the *Illinois Medical Journal*, August, 1915), claims the attention of all who are interested in progressive health administration.

NOTES.

The Status of Milk Production and Distribution.—Early in 1915, Doctor McLaughlin, Massachusetts State Commissioner of Health, appointed four officials of his department to investigate the status of milk production and distribution and the inspection thereof in their relation to the public health throughout the commonwealth. After several months' investigation, during which a considerable amount of data has been collected, the committee has submitted its report. This report reviews the milk situation in Massachusetts, past and present, and the elements which compose it.

The conclusions formulated by the committee include the following:

Epidemics of disease have not infrequently been caused by raw milk, but the amount of communicable disease so transmitted is much less than has often been asserted.

Pasteurization or sterilization is the only practical method for insuring the safety of commercial milk.

No epidemic has been traced with certainty to pasteurized milk.

To make certain of the adequacy of the processes of sterilization or pasteurization, the responsibility therefor should rest upon public health officials.

Milk, while in the possession of the consumer, should be no less scrupulously cared for than while in the hands of the producer or dealer:

(a) It should be immediately placed in a cool place and kept there duly protected until used.

(b) All milk bottles received by the consumer should be washed with soap and hot water as soon as the milk has been removed and should be kept clean until returned to the dealer.

(c) Milk bottles should never be used for anything but milk as provided by statute.

In addition to epidemic diseases the evidence is now conclusive that a very considerable proportion of tuberculosis in children is due to infection by the bovine type of tubercle bacilli taken into the body by drinking raw milk.

Adequate pasteurization as effectively destroys tubercle bacilli as it does the germs of epidemic disease.

Some part of our excessively high infant mortality-rate is probably due to unwholesome qualities of cows' milk furnished to infants. It is generally admitted, however, at present by children's specialists and sanitarians that the use of cows' milk, regardless of quality, furnished only one among many factors in the total causes of infant mortality.

There appear to be some grounds for concluding that in some cities of this Commonwealth, the inadequacy of the total supply of cows' milk for infants and young children is a more serious public health problem than any existing deficiency in quality.

There is at present no law for the state control of milk inspection.

Milk is an economical food even at a higher price than the present.

The report was accompanied by a draft for proposed legislation dealing with subject. This bill provides for a system of state control over the retailing of milk and provides for the grading of milk. The taking effect of this act, should it become a law, will depend upon the population of the community and will not be in full effect until 1921.

The Committee is composed of Dr. Eugene Kelley, chairman, director Division of Communicable Diseases; Mr. Herman Lythoc, director Division of Food and Drugs; Dr. Joseph

E. Lamameux, Public Health Council; Mr. Ed. Williams, Engineering Division.



Below is an excellent example of educational public health publicity as practiced by the Virginia State Board of Health.

Virginia State Board of Health

Bad Colds, Grippe, Pneumonia

Are caused by very small plants called Germs, that come from the Mouth or Nose of persons suffering from them

A PERSON GETS THE GERMS INTO HIS BODY BY BREATHING INTO THE NOSE OR MOUTH THE DROPS OR SPRAY THAT HAVE BEEN SNEEZED OR COUGHED OUT INTO THE AIR BY THE SICK PERSON OR ELSE HE GETS THE GERMS INTO HIS BODY BY PUTTING INTO THE MOUTH SOMETHING THAT IS SOILED BY THE SPIT OF THE SICK PERSON. THE GERMS DO NOT POISON A PERSON WHEN HE IS FEELING WELL AND STRONG AS READILY AS WHEN HE IS WEAK AND TIRED AND CHILLED.

THEREFORE, TO PREVENT THESE DISEASES—

- A. KEEP THE GERMS FROM GETTING INTO THE MOUTH OR NOSE
- B. KEEP THE BODY STRONG
- C. IF YOU GET SICK, DO NOT LET THE GERMS GET TO OTHERS

A. To Prevent the Germs from Getting Into Your Mouth:

1. KEEP AWAY FROM PERSONS WHO ARE COUGHING OR SNEEZING
2. DO NOT PUT INTO THE MOUTH FINGERS, PENCILS OR OTHER THINGS EXCEPT FOOD
3. DO NOT DRINK OUT OF A CUP OTHERS USE WITHOUT WASHING IT.
4. KEEP AWAY FROM CROWDS

B. To Keep the Body Strong:

1. AVOID GETTING HUNGRY, TIRED AND COLD
2. SLEEP AND WORK IN ROOMS FILLED WITH FRESH AIR, TAKING CARE TO KEEP THE BODY WARM AND TO AVOID DRAFTS
3. TAKE AS MUCH EXERCISE AS YOU CAN IN THE FRESH AIR
4. EAT PLENTY OF SIMPLE, NOURISHING FOOD AND AVOID ALCOHOLIC DRINKS
5. CHANGE YOUR CLOTHING WITH THE WEATHER AND NEVER LET THE BODY GET TOO HOT OR TOO COLD

C. To Keep Germs From Others if You Get Sick:

1. COVER YOUR NOSE AND MOUTH WITH A HANDKERCHIEF WHEN YOU COUGH OR SNEEZE
2. IF YOU CANNOT GET YOUR HANDKERCHIEF, TURN YOUR FACE TO THE FLOOR WHEN YOU SNEEZE OR COUGH
3. KEEP AWAY FROM CROWDS
4. WASH THE HANDS FREQUENTLY.
5. DO NOT SPIT ON THE FLOOR

THESE PRECAUTIONS WILL ALSO HELP PREVENT MEASLES, WHOOPING COUGH AND TUBERCULOSIS

PLEASE POST CONSPICUOUSLY!



Are City Babies Cheap?—A recent bulletin of the Chicago Department of Health, under the above heading, reviews *Bulletin No. 109* of the United States Bureau of the Census. It seems that in 1910 death-rate for infants per 100,000 population was 36 per cent. higher for cities than for rural districts of the Registration Area, and for those nine to twelve months of age the percentage of excess was 71 per cent. The increased deaths among city infants is especially

marked for broncho-pneumonia, 113 per cent. excess. The *Bulletin* goes on to say:

"The acute intestinal disorders (diarrheal) show 71 per cent. excess for the city baby. This means that bad air and impure milk play the most important rôle in these deaths, combined as they are with overcrowding, poverty, dirt and ignorance, and, in summer, heat exhaustion.

"This loss of life is only part of the high price we pay for city civilization (?). In cities more people neglect the elementary requirements of health. The burden of this neglect falls most heavily upon the babies. They did not ask to come; they deserve a better fate. In cities artificial feeding is more common; mothers are more involved in bread-winning occupations."



Will Trace Disease to Its Source.—All health officers in California will hereafter distinguish in their reports between cases of communicable disease originating in the territory under their jurisdiction and those originating outside. In this way, it will be possible to keep a closer check upon sources of infection, and epidemics may be more easily prevented. If a case of typhoid is reported in San Francisco, and it is learned that the patient had contracted the disease while on a vacation in the mountains, the health officer for the mountain district can be informed of the matter and thus may take steps to prevent other cases from developing at the same source. This is but one of the methods by which the State Board of Health will reduce the typhoid death-rate in California during the next three years.—January *Bulletin of the California State Board of Health.*



Overcrowding of the Insane in New York.—Extremely serious overcrowding of the New York state hospitals for the insane is again pointed out in the annual report of the State Charities Aid Association to the State Hospital Commission for the fiscal year ended October 1, which has been made public.

All of the institutions are badly overcrowded and the situation in the institutions of the metropolitan district is characterized as "almost intolerable."

The overcrowding, according to the census of October 1, 1915, was 6,779 as against 5,895 a year ago. The fourteen institutions had a cen-

sus of 34,308 patients on October 1, although their certified capacity is only 27,529.

The average of overcrowding is 23 per cent. Last year on the same date it was 21.4 per cent. and in 1913 it was 20.6. The report declares that the crowding has "reached a point almost to menace the health and recovery of the patients."

The Association takes the position that the 1915 legislature and the present administration made a "substantial contribution for a single year" toward relieving the overcrowding, but that the state faces a necessity of making still more appropriations year by year to provide beds for the normal annual increase in the insane population of about 1,000 patients.



Paris, Texas.—The little city of Paris, Texas, of some 15,000 inhabitants, has evoked considerable interest and wide comment on account of its progressiveness and common sense along sanitary lines. This city started in operation in December, 1909, what is said to be the first municipal abattoir and reduction plant in the United States. Prior to the construction of this abattoir, conditions about the private slaughter houses were extremely unsanitary. Now everything is done under the best conditions, which are maintained by thorough inspection. The rules of inspection are the same as are used by the United States government inspectors in the packing houses. The chief inspector is a graduate veterinarian, who has had additional instruction under skilled government inspectors. The abattoir consists of the killing room, the chill room and cooler, and the refrigerating plant, constructed at the cost of \$10,000, and maintained at the monthly cost of approximately \$280. The plant is large enough to take care of about fifty head of cattle per day of ten hours. Its use is not made directly compulsory, but, by city ordinance, all animals must be slaughtered in plants which maintain the same sanitary precautions and equipment as does the city abattoir. It is planned to expand the plant so that it may become both a city and county enterprise, thus extending its benefits into the rural area. Several other cities throughout the south are following this city's example and are planning municipal managed slaughter houses.

Paris is further to be commended on its sanitary plant, the feature of which is its simplicity.

It has installed a pail service system designed to provide for dry closets, and to prevent the pernicious results of soil pollution and fly breeding, resulting from the accumulating wastes of dry closets. Tightly covered five-gallon pails are collected, dumped, the wagon and pails are cleansed, disinfected, deodorized, and returned to the closets in a practically unobjectionable condition. The system is very inexpensive and proves surprisingly satisfactory. Further details of these enterprises may be obtained from *The American City*, November, 1915, *The Country Gentleman*, August 7, 1915, *Ice and Refrigeration*, or upon application to the city secretary.



The Enforcement of Birth Registration.—According to the *United States Public Health Report* for January 28, the Bureau of Census established a temporary registration area for births for the year 1915, consisting of all the New England states and New York, Pennsylvania, Michigan, Minnesota, and the District of Columbia. A permanent registration area for the year 1916 will be defined. It is believed that the laudable desire of the states to be included in this area will undoubtedly bring about radical changes in the attitude of the state officials towards the enforcement of the registration of births. The commissioner of health of the state of New York, Hermann M. Biggs, has apparently set an example for such action in issuing instructions that every discovered violation of the law relating to birth and death registration be reported to the district attorney having jurisdiction for prosecution. The difficulty will be how to ascertain these violations when they do occur. Despite this, the result of the issuing of such instructions will undoubtedly bring about a great improvement in the birth registration.

As an example of what can be accomplished in birth registration under intelligent and persevering enforcement, the record of New York city is cited. The registration of births in this city has apparently reached a higher percentage of completeness than has the registration of deaths in some parts of the registration area for deaths. Birth registration has been found, by checks applied by the city department of health, to show a percentage of completeness in the several boroughs as follows: Borough of Manhattan, 99.4 per cent.; the Bronx, 100 per cent.; Brooklyn, 96 per cent.; borough of Queens, 95

per cent.; and the borough of Richmond, 94 per cent.; the average for the entire city being 98 per cent. The fact that during the last five years the department has instituted several hundred prosecutions where violations of the registration requirements were found has undoubtedly had a material effect in perfecting the city's registration of births.



New Jersey Sewage Works Association.—An important step towards the long talked-of goal, "Efficient Management of Sewage Disposal Plants," and a step of importance to the public health was taken at the State House, Trenton, N. J., Friday, January 28, when the New Jersey Sewerage Works Association was organized. The constitution states that the object of the association is "The Advancement of the Knowledge of design, construction, operation and management of sewerage works."

The organization was ushered in by the State Board of Health with which it will work in close touch, though entirely independent.

That the organization fills a long felt want is indicated by the vim with which it started off. It is already far beyond the bonds proposed for it by the originators of the idea.

The original idea of a yearly meeting at the State House was at once scouted in favor of frequent meetings to be held at various plants of interest about the state.

Any superintendent, manager, or other officer of a municipal or private sewage plant, any civil, hydraulic or sanitary engineer, chemist or bacteriologist, board, commission or department, or any person engaged in design, construction, or operation of sewage works, or engaged in the manufacture or sale of equipment or the same, is eligible for membership.

The officers elected are as follows: president, John R. Downes, Plainfield, N. J.; vice-president, I. Z. Collings, Collingswood; second vice-president, Paul Molitor, Chatham; secretary and treasurer, Fred T. Parker, Atlantic City.



Children's Classes in Tuberculosis.—"One of the most promising developments of the tuberculosis clinic service throughout the city has been the establishment of special children's classes. These classes are designed to care for not only the children patients of the clinics, but also the children of the clinic's adult patients—

those who are known to have been exposed to infection.

"In these classes, which are held on Saturday morning, every effort is made to carry out preventive measures and to secure for all the children proper disposition either in preventoria, sanatoria or open-air schoolrooms.

"An important feature of the children's clinic work has been the courses in physical exercise inaugurated at the Chelsea clinic by the Society for Prevention and Relief of Tuberculosis, and subsequently introduced into other clinics through the coöperation of the Department of Education. The classes have been so well attended and have been so beneficial in improving or maintaining the good health of the children and holding their interest in the clinic that it is hoped it may be possible to extend these classes to other clinics.

"During the coming year, it is proposed to carry on, simultaneously with these classes, a control class for the purpose of comparison.

"It is confidently expected that not only will great benefit accrue to the children, but that interesting statistical data will presently be available."—*Bulletin of New York City Health Department.*



Midwife Inspection in State of New York.—During the last year over four hundred midwives were licensed by the State Department of Health. The state supervising nurses visited and instructed most of these women; they were scattered over thirty-six counties. Many other women were found to be practising without a license, unknown to the authorities of the community, for they were not reporting births. Usually they were unaware that there was any law governing the matter. They were found in most out-of-the-way places, in many of which medical assistance could not be secured when needed. A licensed midwife who would report the births attended was a necessity in such places. Mountain districts remote from any medical service, little groups of foreign people near quarries or mountain camps, settlements on the fringe of larger communities were found where it was impossible to get a physician in the night. Telephone service is not to be found in these places.

In one county where there were ten licensed midwives, fifteen were found to be practising without licenses. Those who were licensed had

delivered forty-nine children during the present year, and the unlicensed women admitted having delivered during the same period a total of seventy-eight. Two women were found who had never heard of being licensed or reporting births, and who admitted that they each probably delivered one hundred children a year. Catholic priests, who speak the foreign languages which these people understand, are giving very

good assistance in inducing suitable women to qualify for a license, and to report every birth attended. How essential suitable care is in these districts may be judged from the fact that a dead mother and her new-born infant, also dead, had a short time previously been found in a cabin on the mountain side where they had been overtaken alone in their hour of need.—*New York State Journal of Medicine*, February.

Public Health Notes.

Public Health Service Hospitals Curb Trachoma.—The establishing of small trachoma hospitals in localities where this contagious disease of the eyes is prevalent presents the best solution of the trachoma problem, according to the statement contained in the annual report of the surgeon general of the United States Public Health Service. The service now has five trachoma hospitals in the three states, Kentucky, Virginia and West Virginia, and so great has been the number of applicants for treatment that a waiting list has been established. In the past fiscal year 12,000 cases of trachoma have been treated, the larger proportion of which were cured, while those in which a cure was not effected have been greatly improved and rendered harmless to their associates. The great majority of these trachoma patients were people who lived in remote sections far removed from medical assistance, and who, but for the hospital care and treatment provided, would have remained victims of the disease practically the remainder of their lives.

"When it is considered," the report of the service states, "that thousands of persons suffering with trachoma, a dangerous contagious disease, would otherwise remain untreated, it is realized how far-reaching results have been obtained through these trachoma hospitals and the other public health work done in this connection. It would be impossible to estimate with any degree of accuracy the number of people who have been saved from contracting this communicable disease by thus removing these thousands of foci of infection."

In addition to treating persons with the disease the hospitals have been used for educational work. Doctors and nurses have visited the

homes of the patients and have explained how to prevent the development and recurrence of the disease. One thousand three hundred and eight such visits were made during the year in Kentucky alone. "It has taken some time," the report continues, "to educate the people afflicted with this disease to the importance of cleanliness and the use of simple hygienic measures in their daily life." That results have been obtained is evidenced by the noticeably better observance of hygienic precautions by those among whom the work has been done.

In addition to the hospital work, surveys were made in sixteen counties in Kentucky, especially among school children. Eighteen thousand and sixteen people were examined, 7 per cent. being found to have trachoma. Similar inspections in certain localities of Arizona, Alabama, and Florida resulted in finding the disease present in from three to six children out of every hundred. Periodic examination of school children for the disease and the exclusion of the afflicted from the public schools are two of the recommendations the Public Health Service lays emphasis upon.

One of the special features of the trachoma work was the giving of lectures and clinics before medical societies in various counties where trachoma hospitals could not be established. Patients were operated upon in the presence of physicians and the most modern methods of treatment demonstrated. Throughout, the purpose has been to stimulate local interest in taking up the campaign to eradicate trachoma.

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Sex Hygiene.—"Sex hygiene is today a fetish, bandied about by the pedagogue, the preacher, the politician and the physician, in the endeavor to

escape the responsibility of indicating the application of the subject to a practical science in education. Congresses debate some phases of sex hygiene; both sides are vehement in urging and opposing the dissemination of knowledge among the young, and while they continue to disagree, the young go on learning in the old-fashioned way.

"The present day board of health bulletin teaches many valuable lessons to the young and to the old—about the fly, about the mosquito, about the germs of disease, about drinking water, about habits of function of the bowels, about the sanitary care of the house and the premises, not even hesitating to go into details when discussing the privy and its dangers. Why should the elemental ideas of sex be taboo?

"Preventive medicine is the largest function of the health office today. The knowledge of dangerous diseases is one of the chief weapons against them. The additional knowledge of the means to prevent them would do away with many diseases in time.

"Sex hygiene means more than the mere knowledge of sex and the functions related—it means the government of the function of sex so that the purposes of sex may be preserved for their proper uses and ends. The education in the physiology and anatomy of the sex organs may be left to the pedagogue, but the instruction in the hygiene of sex as above defined should be within the duties and obligation of the public health office, as best qualified to disseminate such instruction in a way in which it will do the most good."—Isadore Dyer, *Southern Medical Journal*, February.

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Water Purification.—E. O. Jordan, Chicago (*Journal of the American Medical Association*, February 12, 1916), discusses the hygienic aspects of the purification of water supplies. Removal of turbidity may be economically and esthetically important and measures for softening of the water may be demanded, but they are not matters that concern public health. With the increasing density of population, it is becoming more and more difficult to draw for a water supply of any size on an uncontaminated surface supply. In the smaller towns and villages deep wells may suffice. In many regions, however, and in large towns, surface water from rivers or lakes must be depended on and simple

inspection of the water source will show that it is, in an untreated condition, grossly unfit for drinking purposes. This may not be so evident with the untrained eye, and detailed observation of disease prevalence and the bacterial content of the water is necessary. Public water supplies were practically unknown in the middle ages and are a development of modern times. Jordan gives a table showing that over 60 per cent. of the total city population in the United States is at present supplied with water treated by some method of purification, and a large proportion of the remainder is also supplied with hygienically safe water. Hazen estimated that in 1904 52 per cent. of the urban population used unsatisfactory water, while Jordan thinks that at the present time this proportion has been reduced to 20 per cent. at least. Of modern methods of purification, storage is first mentioned. When water of streams is impounded in a reservoir before passing into the water mains, important changes occur and the most important of these is the tendency of the disease-producing bacteria to die off. New York and Boston are relying on this method mainly in their water supplies. The use of slow sand filters was probably the first method employed for water purification on a large scale and the earlier European plants were of this nature. The difficulty in this case is the clogging of the thin upper layer of sand in operation, hence the somewhat different type known as the mechanical or rapid filter has been largely adopted. If a turbid water is first treated with some coagulating chemical such as aluminum or iron sulphate it can be passed through sand at a much higher rate that is possible with untreated water. It has been found possible to use this method with large quantities and while the rapid sand filter is cheaper in construction than a slow one, the cost of operation is greater. Recognizing all charges, however, the total cost is less by the rapid than by the slow process. Germicidal treatment by chemical substances and the utilization of ozone and the ultraviolet ray have been employed in a small way, but the high cost has prevented their general use. Calcium hypochlorite or bleaching powder has, of late years, quite overshadowed all other germicidal agencies. Variations in the character of the water and the composition of the commercial bleaching powder affect, to some extent, the efficiency and the cost, but

under normal conditions the expense of the hypochlorite treatment is very much less than that of filtration. The chief objection is the liability to the production of disagreeable tastes or odors, and complaints on this score are specially common in cold weather. The substitution of liquefied chlorin gas is said to do away with this objection to some extent, but overdosing is still possible. The most conspicuous immediate change in the health rate from the use of purified water is the reduction of the typhoid fever rate. Care is needed in the use of sand filtration to insure this, and careful and unremitting supervision of the operation of all sand filters is essential, as well as in the chlorin and bleaching powder treatment. The chief difficulty there is in the maintenance of an adequate germicidal strength with certain waters and the unpleasant odor or taste which sometimes makes it objectionable to some of the consumers. Tables are given showing marked decrease of typhoid in certain cities from the chlorin treatment, and it has been lately developed, also, in connection with the use of rapid or slow filters. Jordan says it seems likely that sand filtration of the mechanical type with chlorination as an adjunct will become more general in the future.

Pellagra Increasing.—According to the *Texas Medical Journal* the South Texas District Medical Association is alarmed over the growing prevalence of pellagra throughout East and South Texas. Despite the fight that has been constantly waged on this insidious disease since it made its first appearance in the state a few years ago, it has continued to increase, especially in the country communities and in small towns where sanitary conditions are poor. The medical fraternity is not agreed yet as to the cause of the disease, and a serious effort is to be made to definitely ascertain what causes it. A general campaign is to be conducted by the association to educate the people as to public health matters generally, and this can but result in good.

Inadequacy of Ordinary Methods of Disinfecting Typhoid Stools.—"Dr. Edgar M. Green of Easton, Pa., said that reports from about thirty hospitals throughout the state showed that most of the institutions were disinfecting stools with chloride of lime, carbolic acid, or some of the composite commercial disinfectants from a

few minutes to an indefinite time. Pathological experiments showed such disinfection was useless. Steam sterilization, which could be made complete in a typhoid stool in from twenty to thirty minutes, was strongly advised in all hospitals. In private practice where steam was not available, the well broken up stool should be exposed to a 6 per cent. solution of commercial formaldehyde for at least two hours, or treated with a cupful of commercial unslaked lime and hot water."—*New York Medical Journal*, November 13.

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NOT TO BE SNEEZED AT

The Journal reprints the above through the courtesy of "Puck."

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Is There a Lie in the Burial Service?—"A distinguished clergyman in a public address recently delivered from the steps of the City Hall in Brooklyn declared that there was a lie in the burial service—that the practice of ascribing deaths to the Almighty instead of to the true causes was lying of a pretty base order. His declaration aroused a great deal of professedly righteous wrath.

"The wrathful reaction evoked by his brave words is an exact measure of the criminal stupidity of those who mould public thought. Why should an intelligent editor of a great metropolitan daily not know better than to ascribe to God a death from typhoid fever, the source of which is polluted drinking water? Why is it blasphemous in this year of grace to tell the truth about the real origin of infectious disease?"

"Our compliments to the Rev. J. Howard Melish and our good wishes to him in his efforts to state medical truths and defend the Lord against the most hackneyed of slanders.

"Who would have believed that such a simple and honest enunciation would have invited attack? What have the Dark Ages got on us, anyway?"—*Medical Times*, January.



Disinfectant Recommended by the Hygienic Laboratory, Washington, D. C.—Heat in a covered enameled iron pail, 1000 grams of pine oil with 400 grams of pulverized rosin until dissolved. Cool to 80° C. and add 200 drams of a 25 per cent. solution of sodium hydroxide. Agitate thoroughly for at least ten minutes with a rotary Dover egg beater; add water sufficient to make mixture to the original weight and cool by placing the pail in ice water. Use cool water for diluting. The phenol coefficient of this disinfectant is from 4 to 6.

In making this disinfectant use clear, transparent pine oil obtained by the steam or solvent process, not by destructive distillation. This oil distills at 207° and 85 per cent. of it will go over between 207° and 230°. The rosin used should be strained Northern Carolina, Grade E rosin, ground.

The oil costs 40 to 50 cents a gallon, the rosin about 2½ cents a pound, and the total cost of the disinfectant product should not exceed 50 cents per gallon.

It should be referred to as "Hygienic Laboratory Pine Oil Disinfectant."



Federal Control Urged for Tuberculosis—Participation of the Federal government through the United States Public Health Service in the study and control of tuberculosis is urged by a resolution adopted by the National Association for the Study and Prevention of Tuberculosis made public today.

The National Association proposes that by act of Congress a special division of tuberculosis be established in the United States Public Health Service with an adequate appropriation. This division should be manned by experts and should study the tuberculosis problem from every point of view and should, so far as possible, set up standards for the treatment and prevention of the disease throughout the country. One of the problems which it is proposed to study first would be that of the indigent migratory consumptive, particularly in the health resorts of various parts of the United States, such as California, New Mexico, Colorado and Texas. Another problem which it is proposed should be studied is that relating to the causes of tuberculosis. A bill introduced by Congressman Kent of California in the House and by Senator Norris of Nebraska in the Senate provides for some of the things which the National Association asks for and also for a Federal subsidy to hospitals caring for non-resident consumptives.

Commenting on the resolution, Dr. Charles J. Hatfield, executive secretary of the National Association for the Study and Prevention of Tuberculosis, says: "In spite of the fact that tuberculosis is costing the United States from \$500,000,000 to \$1,000,000,000 every year in lives lost, the amount of money being spent annually by all private and public agencies is not much more than \$20,000,000; and while a nation-wide crusade to stamp out tuberculosis has been organized, we are still ignorant of many of the factors that produce it. A few thousand dollars wisely spent in scientific research under Federal supervision will secure results of incalculable benefit to this country."



Shall the Out-Patient Department Include a Division of Hygiene?—The February *Modern Hospital* contains the following editorial by S. S. Goldwater of the Mt. Sinai Hospital of New York:

"The life extension movement, which is now in full swing, proposes to apply the teachings of medical science to the prevention of disease in a more effective way than has heretofore been customary.

"Efforts to prevent disease may be of a social character, attacking conditions which affect large groups of persons, or they may be directed toward the individual. The first method is one

which is properly related to government, and which lends itself readily to the national, state, or local department of health; the second appeals to sanitarians and to other qualified persons who are in a position to reach and to influence the individual. While efforts of this latter kind have hitherto been left to the private physician or to the agents of various voluntary associations which undertake to promote health, it is now generally understood that the hospital and its normal adjuncts, the out-patient department and the laboratory, are in a position to play a useful part in this movement. I would suggest that each hospital establish a department of hygiene as a branch of its out-patient service.

"The principal work of the proposed department of hygiene would be the periodic physical examination of individuals for the early detection of any morbid tendency which is susceptible to control by hygienic measures. By this means many constitutional diseases may be prevented or postponed. But every available opportunity to inculcate the principles of wholesome living should be utilized, and to this end intimate relations should be established between the proposed department of hygiene and the educational bureau of the local department of health. I refrain from suggesting a complete program, because such a program should be prepared with a full knowledge of the institutional resources which are available, as well as of the peculiar needs of the locality.

"The establishment of the proposed department of hygiene would be an innovation; this is about the strongest argument that can be made against it, and I am convinced that it is an argument that will presently yield to the pressure of an insistent demand for a wiser, saner, and more profitable use of the teachings of modern medicine."



How the Government Is Meeting the Malaria Problem.—Four per cent. of the inhabitants of certain sections of the South have malaria. This estimate, based on the reporting of 204,881 cases during 1914, has led the United States Public Health Service to give increased attention to the malaria problem, according to the annual report of the surgeon general. Of 13,526 blood specimens examined by government officers during the year, 1,797 showed malarial infection. The infection-rate among white persons was above 8 per cent., and among colored

persons 20 per cent. In two counties in the Yazoo Valley, forty out of every one hundred inhabitants presented evidence of the disease.

Striking as the above figures are, they are no more remarkable than those relating to the reduction in the incidence of the disease following surveys of the Public Health Service at thirty-four places in nearly every state of the South. In some instances from an incidence of 15 per cent. in 1914, a reduction has been accomplished to less than 4 or 5 per cent. in 1915.

One of the important scientific discoveries made during the year was in regard to the continuance of the disease from season to season. Over 2,000 Anopheline mosquitoes in malarious districts were dissected, during the early spring months, without finding a single infected insect, and not until May 15, 1915, was the first parasite in the body of a mosquito discovered. The Public Health Service, therefore, concludes that mosquitoes in the latitude of the Southern States ordinarily do not carry the infection through the winter. This discovery indicates that protection from malaria may be secured by treating human carriers with quinine previous to the middle of May, thus preventing any infection from chronic sufferers reaching mosquitoes and being transmitted by them to other persons.

Although quinine remains the best means of treating malaria and is also of marked benefit in preventing infection, the eradication of the disease as a whole rests upon the destruction of the breeding places of Anopheline mosquitoes. The Public Health Service, therefore, is urging a definite campaign of draining standing water, the filling of low places, and the regrading and training of streams where malarial mosquitoes breed. The oiling of breeding places, and the stocking of streams with top-feeding minnows, are further recommended. The service also gives advice regarding screening, and other preventive measures as a part of the educational campaigns conducted in sections of infected territory.

This study is typical of the scientific investigations which are being carried out by the Public Health Service, all of which have a direct bearing on eradicating the disease. The malaria work now includes the collection of morbidity data, malaria surveys, demonstration work, scientific field and laboratory studies, educational campaigns, and special studies of impounded water and drainage projects.

Industrial Hygiene and Sanitation.

Industrial Betterment.—In a recent issue of the periodical *Machinery* there appeared a comprehensive article on safety and welfare work. It was written by Mr. Forrest Cardullo and dealt with safety, sanitation, housing, coöperative organizations, profit-sharing systems, pensions, workmen's compensation, and other related subjects.

While Mr. Cardullo finds a general and national movement for the betterment of industrial safety, he also finds the work sporadic and with no definite standards.

"We see here an effort to make workrooms and factories more pleasant for employees, and there an attempt to provide better facilities for the midday lunch. One employer will lay stress on lockers and lavatory facilities, sanitary toilets and such matters. Another employer is equally outspoken in advocating a mutual aid association and in supporting it liberally so that the sick and injured may not suffer. Still other employers concentrate their attention on the housing problem. Some others are earnest advocates of profit sharing. No two firms seem to entertain the same ideas in regard to the needs of their working force."

With reference to the future of welfare work Mr. Cardullo believes that, while details may differ with various industrial establishments, the principles of the welfare of employees is well established and that the employer should give careful attention to this very necessary requirement of his establishment.



Safety Plans that Save Costs.—*Factory*, for February, features as its leading article "Safety Plans that Save Costs" and gives "nine worthwhile plans for reducing every-day accident risks."

1. The greater use of safety guards.
2. The use of guards made in interchangeable units.
3. Safe methods of handling heavy machinery.
4. Padding points that project.
5. The placing of responsibility for safety work in small plants.
6. Runaway elevators prevented by sheet metal guards around controllers.

7. The greater use of stair treads of abrasive metal.

8. Use of windowed shields over dust producing processes.

9. The quick control of moving machinery by electrical methods.



Michigan Workmen Get \$1,213,103 Compensation.—According to the last annual report of the Michigan Industrial Accident Board \$1,213,103.82 was paid to injured workmen and their dependents during the year 1916. This sum does not include \$148,615 paid for medical and hospital services to disabled workmen.

The report shows that one working man was killed on an average of each working day during the year. The total number of accidents reported during the year was 39,781, of which 322 were fatal.

The fatal accidents are classified according to industry. From this classification it appears that the industry of mining was responsible for 116 deaths, transportation for 55 fatalities, the lumbering industry claimed 29, construction 21 and the manufactures of automobiles and automobile accessories 17.



A Far-Reaching Compensation Legal Decision.—While the good that may come from the physical examination of employees in manufacturing establishments has for some time been recognized by progressive manufacturers and workmen in the field of industrial sanitation, it has remained for a court decision to indicate clearly that a recognition of the health of the individual employee is an economic necessity on the part of every manufacturer.

The consequences of ignorance of these conditions by the employer may lead to such grave consequences that the manufacturers must, if only for his own protection, be reasonably sure that those persons whom he employs are in a state of good health.

The full bench of the Supreme Court in Massachusetts, in a decision given on February 7, holds that the Workmen's Compensation Act provides for those employees who have become incapacitated by reason of the fact that some

illness or physical weakness has been aggravated by an incident of their employment.

It was recognized by the court that "grave economic consequences of far reaching effort" may come from the construction given the act, that persons in poor health might be excluded from employment and that the cost of conducting industrial enterprises might become comparatively large, but the decision stated that those matters are factors for the legislature to consider, for the court had only to consider the act as it has been found on the statute books.

The decision is given in the case of a woman who was employed in a carpet factory.

It appeared that her heart was weak and that in pulling a piece of carpet she suffered a strain that brought on an aggravation of her affliction. She was given an award for medical and hospital treatment for the first fourteen days following her injury. This award was contested by the insuring company but was upheld by the decision of the Supreme Court.

The opinion, which was written by Chief Justice Rugg, reads:

"It is enough to say that the occurrence described by the plaintiff when she said 'she felt something give,' and 'felt something else give way,' accompanied by the symptoms of angina pectoris, may have been found to be a personal injury.

"It has been argued with force on behalf of the insured that since the harm to the employee was not wholly the effect of the work, but came in large part from the previous weakened condition of the employee's heart, hence, either there can be no award of compensation, or it should be restricted to that part of the injury which resulted directly from the work, and the part of the injury which followed from the worker's condition should be excluded. Even though the premises be sound, the conclusion does not follow. The act makes no provision for any such analysis or apportionment. It protects the employee. There is nothing said about the protection being confined to the healthy employee. The previous condition of health is of no consequence in determining the amount of relief to be afforded. It has no more to do with it than his lack of ordinary care or to the employee's freedom from simple negligence.

"It is a most material circumstance to be considered and weighed in ascertaining whether

the injury resulted from the work or from disease. It is the injury arising out of the employment and not out of disease of the employee for which compensation is to be made. Yet it is the hazard of the employment acting upon the particular employee in his particular condition of health and not what the hazard would be if acting upon a healthy employee or upon the average employee. The act makes no distinction between wise or foolish, skilled or inexperienced, healthy or diseased employees. All who are rightly describable as employees come within the provisions of the act.

"It is argued that grave economic consequences of far-reaching effect may follow from the act as thus construed. It is said that persons not in good health may be altogether excluded from employment to their severe hardship, while the cost of conducting commercial and industrial enterprises may become prohibitively large, all to the detriment of the general welfare and of the financial resources of the commonwealth. These considerations are of great public moment. But these factors relate to legislate questions and the arguments founded on them are distinctly legislative arguments. They may be entitled to attention and deliberation at the hands of the legislative department of government. In the present form they cannot have decisive significance, even if it were plain that the enumerated consequences were inevitable. The function of the judicial department of the government is simply to determine whether an act is within the power vested by the constitution in the legislature, and then to enforce it according to its true meaning in cases as they arise."

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Prevention Work That Pays.—Under the heading "Prevention Work that Pays," *Safety Engineering* for January cites several striking instances in which industrial accidents have been greatly reduced through the application of preventive measures. Among the experiences given are those of the Industrial Accident Commission of Massachusetts and a group of establishments at Rochester, N. Y.

The Industrial Accident Commission of Massachusetts collected the accident data in forty-eight factories in the state during two consecutive periods of six months each, before and after accident measures had been applied. The in-

quiry disclosed that in these factories as a result of the appreciation of preventive measures the actual number of accidents had been reduced by 20 per cent., the days lost through accident by 36 per cent. and the compensation period by 40 per cent.

In a group of eight concerns in Rochester, N. Y., in which safety work had been going on for three years, it was shown that accidents had been reduced by 50 per cent.



Insurance for Employees.—Doubleday, Page and Company have announced an employee's insurance plan which, with the approval of their employees, has been put into effect at their Garden City (L. I.) plant.

This plan embraces a small contribution on the part of each employee participating in its benefit, and includes

First. An individual life insurance policy which, in the event of death, gives the beneficiary one year's salary.

Second. In the event of sickness from any cause compensation is paid for a period of at least six months and, in some cases, longer or indefinitely, depending on the individual injury.

An arrangement is also made that, in case any of the employees should leave the employ of the company, they may make arrangements to take their policy and continue the payments thereon.



The Workmen's Compensation Act in Massachusetts.—Various measures have been submitted to the legislature of Massachusetts which, if enacted into law, will materially affect the working of the Compensation Act.

There are ten bills which seek to reduce the so-called waiting period of fourteen days. Two bills provide that compensation shall date from the day of injury; three from the eleventh day; two, eight days; one, seven days; while others provide that state employees shall receive compensation from the day of injury. Other bills provide that the present maximum payment of \$10 per week be raised to \$14; while there is still another which would increase it to \$15.



Ohio's Accident Record.—At the convention of the Ohio Industrial Commission recently closed in Cleveland startling figures were brought forth with reference to industrial accidents in Ohio. For the statistics given it appears that

during the twelve months ending June 30, 1915, the total number of workmen killed in Ohio was 482, permanently disabled, 13; partially disabled for life, 1,643; and temporarily disabled, 73,525.

These figures show that the fatal accident-rate was more than one a day; one man a month was disabled for life; four men a day were partially disabled for life.



The Relation of Fur to Anthrax.—The possibility of the transmission of anthrax through the medium of fur wearing apparel has recently received considerable notice in the public press. The following statement appearing in the January 22 *Weekly Bulletin* of the New York City Board of Health must relieve the apprehension of the many who, following the dictates of fashion, have this season found on their raiment a place for fur where fur was never before believed to be either necessary or ornamental.

"In connection with a recent death from anthrax, a question arose as to whether the disease might have been due to the wearing of an infected fur neckpiece. In the absence of any other definite clue as to the origin of this case, a fur collar which had been worn by the patient just prior to the development of her disease was suggested as being possibly responsible for the transmission of anthrax. This suggestion, which received considerable notice in the public press, caused a certain amount of apprehension among persons who wore furs.

"While it has been proved again and again that anthrax may develop among those who handle raw hides, among wool sorters, workers in mohair, and those who handle raw bristles as well, no authentic case of anthrax has ever been reported in one who had either worn or handled furs that had been subjected to the process of dressing and dyeing; a recent careful search of medical literature made on this subject confirms this statement.

The process of dressing fur is one which cleanses it to a very considerable degree, although it does not sterilize the fur which is so treated. The cheaper grades of fur, in particular, are dyed with a variety of vegetable and aniline dyes; it is well known that the aniline colors are, to a very considerable degree, germicidal. While it is conceivable, that furs might, under special circumstances, transmit anthrax, the

likelihood of their doing so is so extremely remote as to make any fear or uneasiness on this score practically groundless. It may, therefore, be safely stated that the wearers of fur are as free from the danger of anthrax infection as any other members of the community."



Physical Examinations of Employees.—The rapid increase in the number of examinations of applicants for work in industrial plants is shown by a report recently issued by the Industrial Commission of Ohio. Prior to 1904 only four

companies required applicants for work to undergo a physical examination, but in 1914 twenty-four concerns, employing approximately 42,000 persons, held such examinations.



The recent bulletin, *Timely Hints to Safeguard Machinists from Injury*, issued by the Pennsylvania State Department of Labor and Industry, is responsible for the statement that last year in Pennsylvania more than \$1,000,000 in wages was lost to injured employees.

Communications.

ANNOUNCEMENT.

The Journal desires to call the attention of its readers to the establishment of a new section devoted to "Communications." Readers are invited to address such communications to the Editor. Letters for publication should necessarily be of general interest and deal with some public health subject.

February 3, 1916.

EDITOR, AMERICAN JOURNAL OF PUBLIC HEALTH,
755 Boylston St., Boston, Mass.

Dear Sir—From time to time one notes in the JOURNAL, and other health literature, references to the difficulties now to be faced in the obtaining of medical and surgical free dispensary and hospital treatment for the indigent and necessitous. This is certainly a most difficult problem and one which presents itself most forcefully to the staff of such an organization as the Association for Improving the Condition of the Poor (New York City). Our organization is divided into two parts, Family Welfare and Social Welfare. An essential part of the social welfare program at the present time is comprised of studies into certain aspects of the clinic problems, studies in reality growing out of the difficulties inherent in the routine procedures of the relief work in the Family Welfare Department. One such study, aimed at the improvement of statistical and social service methods in venereal disease dispensaries, was reported at the Rochester meeting of the Association.

At the present time clinics, whether free or making a nominal charge, are designed for those unable to pay the fee of the private practitioner. Such is the state of the social consciousness that

in most communities this is true of all sorts of clinics, whether general medical or surgical, venereal, school children's clinics for eye, ear and nose and throat affections, etc. It marks perhaps the first step toward the socialization of medical service, a service which should eventually be extended to all in the community regardless of their economic status, on the theory that most diseases are of social origin and are to be combated on a basis of social responsibility with social instruments.

Just now, however, with the emphasis on retrenchment as regards municipal expenditures, the tendency in many communities, and perhaps particularly in New York City, is away from rather than toward the development of adequate municipal facilities for dispensary preventive instruction and dispensary treatment. At the same time private facilities are grossly inadequate, so that we have been casting around for an alternative method which will prove practicable and will not be construed as an evidence of abandonment of the program for the development of social medical facilities. We are, at this moment, working on plans for one or more experiments, to the rough outlines of which I would like to call your attention, possibly presenting the plans in more detail later.

There are two projects which I would in particular like to mention. The first, by no means original or new even in our own community, is a self supporting, pay, evening, venereal disease clinic, which we are planning in coöperation with the New York Society for Sanitary and Moral Prophylaxis and the Social Hygiene Association. This we hope will prove to be a valuable instrument in increasing the effectiveness of venereal disease treatment in the dispensary class of patients. Its equipment will include, if the plans are carried out as laid down at present, complete and approved methods and equipment, intelligent, sympathetic and educational medical service, an efficient method of statistical recording, follow-up social service work, etc.

The other experiment, a more radical departure from the usual private or municipal clinic procedure, is the proposed development of clinical facilities on a *community basis* which shall be self-supporting and which shall provide for general medical, eye and possibly nose and throat work at the start. Essential in the tentative plans for this experiment are paid medical service, evening hours, location in or adjacent to a school building, close coöperation with public school community centre work, the utilization of the equipment for the treatment of school children during the school hours, the encouragement of physical examinations and general preventive medical educational work in the community at large. We are in conference with other agencies and individuals interested in this project, including Mr. Davis of the Boston Dispensary and Mr. Collier of the People's Institute and Training School for Community Centre Workers, and, if funds can be found to finance it from the point of view of initial expenditures, an effort will be made to demonstrate the financial success, the medical and health value, and community worthwhileness of such a project.

These are merely suggestions of further thoughts and plans growing out of data already presented in the JOURNAL or at the Health Association meetings. It occurred to me that you and your readers might be interested in the plans outlined above. Needless to say the projects are strictly in the formative stage and comment and criticism is solicited, particularly if it is of a constructive and helpful character, enabling us more readily to make successful

demonstrations in these rather new fields of outpatient service.

Very truly yours,

D. B. ARMSTRONG,

Director, Department of Social Welfare, The New York Association for Improving the Conditions of the Poor.

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February 23, 1916.

EDITOR, AMERICAN JOURNAL OF PUBLIC HEALTH,
755 Boylston St., Boston.

Dear Sir—The astonishing versions of medical and public health matters that from time to time crop out in the public press are too well known to all workers in the public health field to produce any feeling of resentment or surprise. Incidentally, I may say that from my experience the errors have usually been more from failure to give to the representatives of the press a clear-cut newspaper story than from any deliberate intent on their part to garble and mislead as to facts; but most of us look to the AMERICAN JOURNAL OF PUBLIC HEALTH as a publication in which facts may be presupposed to have been examined carefully as to correctness and vouched for by inclusion in its columns. I was, therefore, surprised to find in the February issue, under "Public Health Notes" an item entitled "Rural Sanitation Grows," the same being a quotation from the *New York Times*, issued November 19, 1915. This item is an ordinary news item, noting the establishment of a United States Public Health Service headquarters for rural sanitation in the city of St. Louis. The paragraph that is extremely misleading is the following, which I quote in its entirety:

"The entire sanitation work of the government is in charge of Dr. L. L. Lumsden of Washington, who will go to St. Louis to aid in establishing the new bureau. The work of rural sanitation by the government, Doctor White says, grew out of an epidemic of *malaria* seven years ago in North Yakima, Wash. About 3,000 persons were about to give up their homes, but the government sent physicians and chemists, who stamped out the disease. Since then rural sanitation has been regarded as a class of government work distinct in itself."

Inasmuch as I chanced to be at the time of the beginning of this work assistant commissioner of health of the state of Washington, in which North Yakima is located, and, before its

conclusion, commissioner of health, I think I can lay claim to being reasonably familiar with all of the circumstances of this work. Also, the facts are very widely and publicly known in public health circles. A few years ago, the JOURNAL OF PUBLIC HEALTH itself published a brief but comprehensive article on the entire campaign by Doctor Tetreau, health officer of the city of North Yakima, Yakima County, Wash.

The facts are, of course, that the disease in the case in question was typhoid fever, not malaria. The statement that about 3,000 people were about to give up their homes is entirely unwarranted, and the only representative of the government was Doctor Lumsden, who came at the invitation of the State Board of Health of Washington and the local health authorities of North Yakima and conducted an intensive campaign which, almost from the entire beginning, broadened out from the subject of typhoid prevention to the general subject of efficient local health administration.

The clipping in question purports to be printed from an interview with Dr. M. J. White of the United States Public Health Service in St. Louis. It seems most unlikely that Doctor White ever made any such statements, as I know personally that he was quite familiar with the circumstances of this outbreak, but even if he did make them, it seems as if such a remarkable statement as that "3,000 people were about to give up their homes" because of an epidemic of malaria ought to have aroused the attention sufficiently of an editor of a journal such as the JOURNAL OF PUBLIC HEALTH to lead to an investigation, and an investigation of the files of the JOURNAL itself would soon have corrected such an erroneous statement.

Sincerely yours,

EUGENE R. KELLEY,

Director of Division of Communicable Diseases,

State Department of Health, Commonwealth of Massachusetts.

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February 28, 1916.

EDITOR, AMERICAN JOURNAL OF PUBLIC HEALTH,
755 Boylston St., Boston, Mass.

Dear Sir—I note in the February number of the AMERICAN JOURNAL OF PUBLIC HEALTH, on page 182, a quotation from the *Texas Medical Journal* which refers to Karl Pearson's contention that a high infantile death-rate is, because of its elimination of the unfit, the cause of a lowered mortality in the succeeding years of life. This subject has been carefully considered by Dr. Newsholme in two of his reports on Infant and Child Mortality. The discussion may be found on page 15 of the Supplement to the Local Government Board Report of 1909-10, and on page 43 of the Supplement to the Report for 1912-13. Newsholme shows that, as a matter of fact, in various districts in England a high infant mortality is followed by a high mortality in the next succeeding years of life up to twenty, and that a low infant mortality is followed by low mortality in the succeeding years. Newsholme believes that Pearson's error is dependent on his use, not of infant mortality rates as ordinarily calculated, but upon life tables. The life tables employed for comparison were not made in the same way. Furthermore Pearson's data were all previous to 1900. It would appear from this that by reducing infant mortality we are not after all encouraging race deterioration.

Yours truly,

CHARLES V. CHAPIN,

Superintendent of Health, Providence, R. I.

Legal Decisions.

Patent Medicine—False Statements Concerning Shirley Amendment to Pure Food and Drug Law Held Constitutional: *Seven Cases of Eckman's Alternative v. United States; U. S. Supreme Court, January 10, 1916.*—"Eckman's Alternative" had been shipped in interstate commerce

from Chicago to Omaha. Libels were filed by the United States Government under the following provision of the Shirley Amendment to the Federal Pure Food and Drugs Act: "If its package or label shall bear or contain any statement, design or device regarding the curative or

therapeutic effect of such article or any of the ingredients contained therein, which is false and fraudulent." In the package with each bottle was a circular containing the following statements: "Effective as a preventative for pneumonia." "We know it has cured and will cure tuberculosis." It is charged that this is false and fraudulent in the meaning of statute as above stated. The opinion by Justice Hughes denies the defendant's contention that the statute applies only to the actual label of the bottle and not to an enclosed circular of the sort here involved. The opinion also involves holding that a statement of this sort is not an honest expression of opinion upon which there may be doubt but in an absolute falsehood.

The case is also important in holding that this amendment is constitutional. The court reiterates a principle laid down in previous cases: "Congress is not to be denied the exercise of its constitutional authority over interstate commerce, and its power to adopt not only means necessary but convenient to its exercise, because these means may have the quality of police regulations."

✱

Industrial Disease—Workmen's Compensation Laws—Death Resulting from Typhoid Fever Held to be Within the Wisconsin Workmen's Compensation Law: *Vennen v. Dells Lumber Co.*, 154 N. W. Rep. 640.—An employee of the defendant Company died of typhoid fever caused by drinking impure water furnished by his employer. The plaintiff, the widow of the deceased, sues to recover damage under the provisions of the Workmen's Compensation Law. The pertinent section act in question follows:

"Liability for the compensation hereinafter provided for, in lieu of any other liability whatsoever, shall exist against an employer for any personal injury accidentally sustained by his employee, and for his death, in those cases where the following conditions of compensation concur: . . .

"(2) Where . . . the employee is performing service growing out of and incidental to his employment. . . .

"(3) Where the injury is proximately caused

by accident, and is not intentionally self-inflicted."

The court says: "The facts alleged show that the parties to the action were subject to the compensation act. The inquiry then is: Was Vennen's death proximately caused by accident while he was 'performing services growing out of and incidental to his employment?' . . . Do the allegations state a case showing that Vennen's death is attributable to 'accident' in the sense of the compensation act? It is urged that the contracting of typhoid disease under the facts and circumstances stated does not show that his death was due to an accidental occurrence. The term 'accidental,' as used in compensation laws, denotes something unusual, unexpected, and undesigned. The nature of it implies that there was an external act or occurrence which caused the personal injury or death of the employee. It contemplates an event not within one's foresight and expectation resulting in a mishap causing injury to the employee. Such an occurrence may be due to purely accidental causes, or it may be due to oversight and negligence.

"The fact that deceased became afflicted with typhoid fever while in defendant's service would not in the sense of the statute constitute a charge that he sustained an accidental injury, but the allegations go further and state that this typhoid affliction is attributable to the undesigned and unexpected occurrence of the presence of bacteria in the drinking water furnished him by the defendant, as an incident to his employment. These facts and circumstances clearly charge that Vennen's sickness was the result of an unintended and unexpected mishap incident to his employment. These allegations fulfill the requirements of the statute that the drinking of the polluted water by the deceased was an accidental occurrence while he was 'performing services growing out of and incidental to his employment.' It is alleged that the consequences of this alleged accident resulted in afflicting Vennen with typhoid disease, which caused his death. Diseases caused by accident to employees while 'performing services growing out of and incidental to his employment' are injuries within the contemplation of the workmen's compensation act."

Personal Notes.

Miss Carolyn Van Blarcom will become on March 1 executive secretary of the Illinois Society for the Conservation of Vision, thus terminating her six-years' connection with the New York State Committee for the Prevention of Blindness in a similar capacity.

Under her administration the New York Committee inaugurated and developed its well-known campaigns against blindness from babies' sore eyes and wood alcohol; and established, at Bellevue Hospital, the first reputable school in America for the instruction and training of midwives. In connection with the latter work Miss Van Blarcom was commissioned, in 1911, by the Sage Foundation to make a special study of the system of training and supervising midwives in England, as well as the relation of this system to the public health; and on her return to this country she presented the results of this investigation in the volume entitled "The Midwife in England."

The Illinois Society, which was organized a year and a half ago under the leadership of Mr. Byron Lathrop and Dr. Thomas Woodruff, is an active one; while the secretary of the State Board of Health, Dr. C. St. Clair Drake, has already shown his interest in sight-saving work and has already taken steps to put force into the state's protective legislation. To this situation Miss Van Blarcom will bring, in addition to her experience, a native initiative and energy, an ability to write and say things originally and effectively, and a gift for securing enthusiastic coöperation.



In a recent issue of *Health News* of the New York State Department of Health, Dr. Hermann Biggs comments on the appointment to the Anna M. R. Lauder Professorship in Public Health at Yale University of Prof. C.-E. A. Winslow, formerly director of Public Health Education and editor of the *Health News* of the state of New York. "His selection to fill the first endowed chair of public health in this country at Yale," Doctor Biggs, says, "is a source of gratification to all of his associates in the de-

partment, only tempered with regret that his active connection with public health work in New York has thus been severed." Dr. Matthias Nicoll, Jr., was appointed to succeed him, and New York deems itself fortunate in securing such an able and experienced man as Professor Winslow's successor.



February first Dr. J. T. Black retired as health officer of the city of New London to assume the duties of secretary of the Connecticut State Board of Health.



Mr. Charles H. Kilbourne has severed his connection with the New York City Department of Health and has opened a New York office as a consulting public health engineer, ready to give an advice on matters relating to food sanitation and hygiene.



The following applicants were elected for membership in the American Public Health Association:

C. A. Bentz, M. D., Buffalo, N. Y. Director, Department of Hygiene, University of Buffalo.

James Coleman Winn, Gilmer, Texas. County Health Officer.

H. E. Hasseltine, M. D., Hygiene Lab., Washington, D. C.

Prof. William T. Foster, M. S., Easton, Pa.

Ed. H. McCuistion, Paris, Texas.

California State Board of Health, Sacramento, Cal.

Samuel W. Frost, Cincinnati, Ohio.

Louis H. F. Mouquin, New York City.

Paul M. Stewart, U. S. P. H. Service, Ellis Island, N. Y.

Carl H. Watson, C. E., Great Neck, L. I., N. Y.

Raymond Fitzhugh Herndon, Houston, Texas.

Henry S. Bartholomew, Lansing, Mich.

William W. Latham, M. D., Crockett, Texas.

Merle Starr Nichols, Madison, Wis.

Heber Carss Janieson, Director Prov. Lab., Edmonton.

Dr. B. Samper, Bogota, Colombia, South America.

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AMERICAN.

Albany Medical Annals.

XXXVII. February.

The Present Standard of the Care and Treatment in State Hospitals. William Mabon.

American City, The, New York.

XIV. February.

American Cities and the Prevention of Unemployment. John B. Andrews.
Charities and Promoting Normal Family Life. Shelby M. Harrison.
Three Ideals for an Annual Report. Editorial.

American Journal of Clinical Medicine, Chicago.

XXIII. February.

The Present Pandemic Simulating Influenza. J. F. Biehn.
Vaccine and Serum Therapy in Everyday Practice. W. C. Wolverton.

American Journal of the Diseases of Children, Chicago.

XI. February.

Tuberculosis in Infancy. Charles Hunter Dunn.
Résumé of Work on Tuberculosis in Children, for 1915. May Micheal.

American Journal of Tropical Diseases and Preventive Medicine, New Orleans.

III. January.

The Control of Asiatic Cholera on International Trade Routes. Allan J. McLaughlin.
Notes on the Breeding Places of Anopheles. H. P. Barret.

Engineering Record, New York.

LXXIII. January 8.

Privately Financed Sewer System for Small Town Produces \$2,000 Yearly Revenue. H. W. Taylor.
Federal Control of Stream Pollution. Earl B. Phelps.

February 12.

Largest Imhoff Tank Plant Nearly Ready to Treat Rochester's Sewage. C. Arthur Poole.
Remodel Septic Tank into Two Story Tank.

February 19.

Cleanliness Standards for Street Cleaning Established for the First Time. Richard T. Fox.
Air Diffusers Tested at Milwaukee Sewage Plant. T. C. Hatton.

Journal of the American Medical Association, Chicago.

LXVI. January 15.

Food Poisoning by the Bacillus Paratyphosis B.—An Epidemic Due to the Organism Isolated from Pie. Bernstein.

January 22.

Pasteurization of Milk Supplies as a Protection against Typhoid Fever—Report of an Epidemic. J. C. Geiger and F. L. Killy.

February 5.

Conservation of Vision and Prevention of Blindness. G. E. de Schweinitz.
Progress in the Milk Industry. Editorial.

February 12.

The Purification of Water Supplies. E. O. Jordan.
Pellagra: Causation and a Method of Prevention—A Summary of Some of the Recent Studies of the U. S. Public Health Service. J. Goldberger.
Routine Wassermann Examination of 4,000 Hospital Patients. I. C. Walker and D. A. Haller.

February 19.

Development of a Fifth Year in Medical Education in the United States. S. W. Lamberd.
Cancer of the Breast: Figures Which Show that Education Can Increase the Number of Cures. J. C. Bloodgood.

Journal of Laboratory and Clinical Medicine, St. Louis.

I. January.

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Gonococcus Complement Fixation—A New Lipoid Antigen. Carl C. Warden and Louis I. Schmidt.
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CIII. January 29.

A Stain for Tubercle Bacilli. Emanuel Klein.

February 12.

So-Called Grippe. J. B. Rucker.

Public Health Journal, Toronto.

VII. February.

The Work of Bureaus of Child Hygiene and Medical Inspection of Schools. Peter H. Bryce.
A Few Hints to the Medical Profession in Relation to Public Health Work. G. E. De Witt.
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The Eradication of Tuberculous Cattle from Milk Herds. A. W. Tracy.
Anti-Typhoid Inoculation. C. W. Bliss.
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IX. January.

Sanitary Preparedness. Rupert Blue.
A National Health Program. A. T. McCormack.

February.

The Small Town—The Neglected Unit in Sanitary Administration. A. W. Freeman.
The Effect that the Sanitary Work Accomplished in Cuba and Panama Has Had and Will Have upon the Sanitation in the Tropics. W. C. Gorgas.
The Sex Question in Public Health. Isadore Dyer.

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The Negro as a Health-Factor. Oscar Dowling.
United States Government Meat Inspection and How It Might be Supplemented by State and Municipal Inspection. A. O. Lundell.
Vital Statistics. J. D. Covert.
Health Conservation after Forty. J. L. Davis.

United States Public Health Reports.

XXXI. January 28.

The Enforcement of Birth Registration.
Plasmodium Malariae (Quartan). J. C. Geiger and
 F. L. Kelly.

February 4.

Mental Manifestations of Pellagra. W. F. Lorenz.

February 11.

Morbidity Registration in the United States. John S.
 Fulton.

Anopheles Punctipennis Say. M. Bruin Mitzmain.

February 13.

Sale and Use of Poisons. Martin I. Wilbert.
 Vitamines and Nutritional Diseases. Atherton Seidell.

February 25.

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 Louis I. Dublin.

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GREAT BRITAIN.

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 Grouping of Strains of Meningococcus. J. A. Arkwright.
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I. January 8.

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 Serologic Tests in Dysentery Convalescents. J. C. G.
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January 15.

Bacteria of Gangrenous Wounds. Dean and Monat.
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 and Milne.

Journal of State Medicine, London.

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Dust Diseases. J. M. Beattie.
 Deformity as a Cause of Industrial Disablement or
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Lancet, London.

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 Outbreak of Anthrax Conveyed by Infected Shaving
 Brushes. R. R. Elworthy.
 Sanitation in Billets and Camps. A. White.

Medical Officer, London.

XV. January 8.

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 Studies in the Interpretation of the Results of Water
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January 15.

After-Care of Consumptives.
 Prophylactic Vaccination for Varicella. Sophie
 Rabinoff.

January 22.

The Teaching of Housewifery.
 The First Municipal Whooping-Cough Clinic. Paul
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January 29.

Sale of Diluted Milk.
 Tropical Sanitation in Its Relation to General Sanita-
 tion. W. C. Gorgas.

February 5.

The Duties of a Sanitary Section in the Field. Charles
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 Welfare Supervision of Munition Workers.

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XXIX. January.

Filtration of Drinking Water. J. W. Talent.

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The Notification of Measles and German Measles.
 The Evolution of a County Health Department. A.
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 Some Thoughts on School Medical Inspection. J. J.
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LII. December 13.

Vaccination against Typhoid and Cholera. F. Hueppe.
 Summer Diarrhea. E. Marx.
 Camp Diseases and Importance of Contact Infection.
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December 27.

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Deutsche medizinische Wochenschrift,
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XLI. December 2.

Twenty-Five Years of Antitoxin Serotherapy. H.
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 Tardy Tetanus. O. Teutschlaender.
 Typhoid in Soldiers. H. Scholz.

December 23.

Economic Technic for Bacteriologic Research. F. Guth.
 December 30.

Stained Beer-Agar Culture Media. Sobel.
 Social Service in the Hospitals. Schwalbe.

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XXVIII. November 11.

Immunization with Formaldehyde-Treated Tetanus
 Toxin; Improved Technic for Production of Anti-
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November 18.

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 Vital Staining of Spirochetes. Weltmann.

December 2.

Positive Typhoid Bacilli Cultures and Agglutination in
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 The Bacteriologic Laboratory Train. Arzt.

December 16.

Improved Technic for Bacteriologic Study of Cholera.
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No. 4

INFLUENZA AND PNEUMONIA.

A Symposium presented before the Massachusetts Association of Boards of Health, Boston, Mass., January 27, 1916.

This symposium summarizes the opinions of several widely known health workers on the modes of infection, spread, prevalence and nature, epidemiology, and legislative and executive management of influenza and pneumonia—the two diseases which so greatly increased our morbidity rates during the winter season.

DR. M. J. ROSENAU, *Boston*: I have been asked to open this symposium by saying something as to the causes and modes of spread of these diseases. As the hour is late, and I do not wish to take much time from those who are to follow in the discussion and who will consider the epidemiological features and administrative control of these diseases, my part of the program is to play the prelude in order to direct attention to the subject; I will therefore purposely be brief and leave out many things which might be said on the subject of etiology. Furthermore, the exact etiology of these diseases concerns us less than their modes of spread. Take, for example, the case of influenza,—grippe. It makes comparatively little difference to us from the standpoint of preventive medicine, from the standpoint of the health officer, whether this disease is due to the bacillus influenza or whether some of

these so-called gripes and grippal colds are really streptococcal infections or due to pneumococci or other microorganisms, or even to a filterable virus, as we have reason to suppose they may be in accordance with the work of Krause of Vienna. If we know how they are spread we may be able to control them. Again it should be clearly kept in mind throughout this discussion that our ignorance is profound not only as to the etiology but much concerning the pathogenesis and epidemiology of these affections.

I think we have a pretty clear idea of how influenza is spread,—by the secretions from the nose and mouth. The virus leaves the body in these secretions and enters likewise through the mouth or through the nostrils of those who receive the infection. In other words, it is a direct contact infection in the vast majority of cases, occasionally contracted indirectly in ways that I prefer to leave until we

have a word about pneumonia, because I think there is a much larger misunderstanding, or perhaps lack of knowledge, concerning pneumonia than almost any other disease or group of diseases in the communicable list. We place pneumonia frankly and fearlessly and clearly, despite our limited knowledge of that disease, with other communicable or contagious diseases. If pneumonia were a new disease, it would be regarded as contagious as diphtheria or tuberculosis, or, frankly, as scarlet fever, and there would be no question but that antiseptic principles would be used; that isolation would be employed, and that other means would be adopted in the administrative control of this disease, just as in other contact diseases.

Pneumonia is a general term, and includes not one disease but a group of diseases. This has been fairly worked out by Dochez and Cole and corroborated by a number of other workers. We have at least four pneumococcal diseases causing croupous or lobar pneumonia.

The first group is due to a pneumococcus, which we call group one of this classification and causes 30 to 47 per cent. of all cases of pneumonia, and has a mortality of about 24 per cent. It is therefore a fatal disease.

In the second group we have another pneumococcus, very closely related to the pneumococcus which causes the first group, but about as different from that pneumococcus as a wolf is from a fox. These two pneumococci have distinct biological differences, which can be readily

determined in the laboratory. There is no trouble to distinguish one from the other, particularly by certain agglutinations, etc. This group is responsible for from 18 to 39 per cent. of all the cases of pneumonia, and is fatal in about 60 per cent. of the cases caused by it. In other words, the person who gets pneumonia with this particular pneumococcus has a particularly virulent infection, almost as fatal as the pneumonic form of plague.

The third group of pneumonia is due to the pneumococcus mucosus. It has a distinct mucoid capsule and distinct characteristics which we readily recognize in the laboratory by abundant mucous-like stringy growth on surface colonies. This particular pneumococcus is responsible for only 8 to 13 per cent. of all the cases of pneumonia, but is fatal in about 61 per cent. of cases,—again a particularly fatal form of pneumonia.

Then we have the fourth group, which is a heterogeneous group of pneumonias, due to all sorts of microorganisms that do not classify themselves, but they represent only 20 per cent. of all cases of pneumonia, and only 7 per cent. of such cases are fatal. That is a "benign" kind of pneumonia, and not very prevalent.

Observe, please, that groups one, two and three are responsible for 80 per cent. of all cases of pneumonia, and furthermore, that these three pneumococci, 1, 2 and 3, are found only in cases of pneumonia, in persons who have recently had pneumonia, and in persons who have recently been directly in contact with a case of pneumonia.

We used to say that it was the easiest thing in the world to find the pneumococcus in the throat of almost anybody. When I was a young student in the laboratory, following Sternberg's classic observation, one of the things that every bacteriologist did was to take some of his own sputum, or some material from his throat, and inject it into a rabbit. The rabbit would get a pneumococcus septicemia, from which it would die, and from the heart's blood of that rabbit we got a pure culture of pneumococcus, so we said that the pneumococcus practically exists everywhere, you cannot avoid it, and as soon as certain conditions come along, where one's vitality is depressed, then he gets pneumonia, there is no way of getting away from it. Now we know that that is not so, that practically all these pneumococci, found in normal throats, which at present are probably in my throat and may be in the throats of most persons in this room and in the population at large, do not belong to the group of pneumococci which are responsible for 80 per cent. of all cases of pneumonia and for over 90 per cent. of all deaths from pneumonia. This makes it very clear from the epidemiological standpoint that the fatal forms of pneumonia are contracted from other persons who have pneumonia or through carriers who are in direct contact with the disease. You see we have exactly the same problem in pneumonia that we have in diphtheria, that we have in scarlet fever, that we have in many other communicable diseases, and we will never be able to control pneumonia, as

we shall doubtless hear from those who are to follow, unless we adopt measures based on these facts. The administrative control of pneumonia must be developed along those principles. Hence the importance of notification, classification in the laboratory, isolation and the adoption of anti-septic practices.

So far as the modes of spread are concerned, I have divided them briefly into four categories. If people want to avoid influenza and pneumonia, as well as other inflammations of the respiratory tract, the first and most essential thing is to avoid exposure to infection. That is what we advise in the case of whooping cough, measles, scarlet fever, diphtheria, and all the rest of the infections which leave the body in the secretions from the mouth and nose. Isolate the sick. Keep away, if possible, from people who are coughing and sneezing, and who are laid up with colds or coughs or whatever they may call them. Then when, as at present, the disease is more than epidemic, we might say practically pandemic as I understand it, it is advisable to keep out of crowds and especially out of badly ventilated places like crowded street cars and close, badly ventilated offices, where people have colds and are coughing and sneezing and are spreading the infection broadcast, and where we can hardly hope to avoid it under such conditions.

Of course general precautions, such as those against the common drinking cup, the direct interchange from the mouth by kissing and by the use of handkerchiefs and towels and other

objects, and children's toys that have recently been mouthed, covers one of the important ways of avoiding the infection. One of the habits (which no one should cultivate but everyone should avoid) is the habit of carrying the fingers to the mouth and the nostrils, for that is a bad sanitary habit, and is probably responsible for conveying this and other infections from various sources to our mouth and nose. One of the ways in which these infections are transmitted is one of our social acts, common to friendship. I visit a man who has a cold. He is coughing and sneezing. He obeys the sanitary precept of holding his hand before his mouth, and he receives the discharge there. I just happen to come in and he shakes hands and transfers "the stuff" to my hand. In a little while I go *this* way or *that* way and convey it to my nostrils, and in twenty-four hours I have a chill and a cold just like he had. That may be one of the ways in which these infections are occasionally transmitted. There are a thousand and one ways involved in what we now call contact infection. It is of course not necessary to speak of these details to this audience, because they have often been discussed and are quite familiar.

The second way to avoid these infections is to increase our resistance to them, that is, to improve our immunity and to avoid lowering our "vital tone," whatever that may be. Just how effective these measures may be in some diseases I am not quite certain, but I do feel sure that in this particular group that we are now discussing, namely, influenza and pneu-

monia, it does play a very important rôle, for we all know people who more or less habitually have colds on the least provocation, we know families in which they are rampant and occur more or less frequently, whereas other persons and families seldom have these infections, although they are more or less equally exposed. We must come to the conclusion that the resistance of some is superior to that of others. Now, all that we know on this subject is, in very general terms, that plenty of sleep and good food and regular habits and out-of-door exercise, and avoiding excess, and everything that makes for proper, clean living, helps our resistance, whereas the contrary undermines our health in this regard and increases our susceptibility.

Popularly and among physicians it is believed that cold and wet are especially baneful. I have never been able to satisfy myself that they have very much influence in this regard whatever. That, however, is only an impression, and impressions mean very little. I have heard over and over again, since these epidemics have been prevalent this winter, that if we could only have three or four real cold dry days we would have an end of it. We have had three or four real cold, dry, clear days, and we have not reached the end. Nevertheless, I hear that statement repeatedly. On the other hand, physicians tell me that if we have a thaw there will be a great increase in the number of colds and sore throats and troubles of the kind that we are discussing. Now, I do not deny that there may be some relationship between atmospheric and

telluric conditions and the prevalence of these infections: there may well be; I can conceive, perhaps, that there is; but I do not believe that that relationship has been demonstrated. I do know, however, that formerly epidemiologists made a particular point of studying such relationships. That has not been the fashion recently, and I believe it would pay to study those relations with modern methods, and we may learn something about them that would really be profitable and be rewardful so far as prevention is concerned. So far as impressions are concerned, if somebody would ask me what seems to be the most important thing about our environment to bring about such conditions of cold, I would say dust, because my personal experience is that if I travel and get exposed to a lot of railroad dust it is pretty apt to light up a rhinitis, although otherwise I rarely have a cold. So that I sort of have a prejudice against dust and think if we could have cleaner air and less street and house dust we should have fewer inflammations of the respiratory tract.

In the third category, of prevention, I would say that it is important to keep the nose and mouth clean. Of course by that I mean the maintenance of the mucous membranes of the upper respiratory tract in a normal condition, so that it may have a normal blood supply, so that it may be normally moist, not too dry and not congested. Of course a person with adenoids, polypus or chronic catarrhal conditions and all that sort of thing has a focus through which he is pretty apt to contract infections. It is an open

door not alone for only local but constitutional infections which may be serious, so that keeping the mucous membranes of the nose and throat in normal condition is important. Whether to advise a daily lavage or washing of these membranes or not I am sure we will have to leave to the nose specialists. They advise against it, and consider the dangers of the nose douche in the ordinary hand to be rather serious. So, perhaps, we had better be conservative about advising people using such things as nose douches and the like.

Finally, in the way of prevention I think a word to those who have these troubles is important. This brings me to the fourth category. If persons who have a cold, or "grippe," would only go to bed for two or three days during the height of their trouble they would not only profit themselves very much, for they would get well very much quicker, their convalescence would be shortened, the danger of complications would be lessened, the whole course of the disease I think would be lightened; and furthermore they would prevent many other persons from getting their cold, because we surely know that these colds are most communicable during the early stages, when the mucous discharges are at their height. Of course they continue to be communicable for some days and weeks afterwards in many cases. We have the phenomena of carriers here, as we have in other infections, but if persons would stay in bed, more or less isolated for the first few days of a cold, it would save spreading it to a great many others.

If they would keep out of crowds and take the proper sanitary precautions of using handkerchiefs, etc., whenever they had to cough and sneeze, it would be very helpful.

These remarks are only intended as an introduction to the subject. We must frankly face the fact that we are in black ignorance concerning much of these diseases—even their etiology and modes of spread. Hence our prevention measures do not rest on a secure foundation; however I have sketched in the briefest way what I understand to be our present knowledge of the causes of these infections, and their modes of spread, and we will now hear from those who are to follow more concerning their prevalence and their nature, their epidemiology and their legislative and executive management. It is our pleasure first to hear from Dr. Francis X. Mahoney, health commissioner of Boston, on this subject. Doctor Mahoney.

DR. F. X. MAHONEY, *Boston*: After listening to Professor Rosenau's remarks I am certain that pneumonia and the respiratory diseases should be made reportable to the board of health, so that we might intelligently try to combat them. Our only way of knowing the prevalence of these diseases is through our own acquaintance among the physicians of Boston, unless they occur in epidemic form and we hear of them probably from the newspapers.

In New England the winter season is liable to present many sudden and extreme variations in climatic conditions, and, as one result, catarrhal

complaints are almost universal; every one expects one or more "colds," and the organisms which occasion these minor ailments are also the cause of the more severe conditions such as bronchitis and pneumonia which prevail among those most susceptible either at the extremes of age or on account of debility.

In the year 1890 there was a severe outbreak of so-called influenza or grippe, an acute infection, presenting different symptoms from the ordinary respiratory infections, and everywhere accepted as a disease entity. From that time to this "influenza," so called, has figured annually in our death-rates, the number of deaths attributed to this cause ranging from 215 in 1900 to 12 in 1914, and averaging 61 per year. Contrary to what one might expect, there seems to be no increased number of deaths from bronchitis and pneumonia in the years when the influenza mortality is the highest.

For example: in 1900, with 215 deaths from influenza, there were 1,545 deaths from bronchitis and pneumonia, and in 1914, with only 12 deaths from influenza, there were 1,502 deaths from bronchitis and pneumonia.

In the last twenty-five years the general death-rate has declined from 22.66 in 1890 to 16.06 in 1914, a decline of 29 per cent. In the same period the death-rate per 1,000 population from influenza, bronchitis, broncho-pneumonia and pneumonia has declined from 3.49 in 1890 to 2.06 in 1914, a decline of 41 per cent.

This great decline may be more

apparent than real, for it is probable that many cases which in 1890 were credited to pneumonia would today be more carefully diagnosed and credited to malignant diseases, heart disease, nephritis, etc.

The compilation of statistics from death returns must inevitably be accompanied within a certain percentage of error due to faulty diagnosis and it may be presumed that the great majority of these influenza deaths were so reported on account of the clinical picture alone, and that any acute respiratory infection accompanied with great prostration, perhaps even severe pneumonic infections causing death before consolidation occurred, might cause this clinical picture and result in a death return for influenza which ought to be accredited elsewhere.

The recent prevalence of the "grippe," so called, although subject to careful laboratory examinations by different workers, has failed to show any prevalence of the influenza bacillus. Rather the indication is of infection with a streptococcus or pneumococcus of especial virulence.

The newspapers gave front page articles for awhile on the presence of a new and fatal disease, "acidosis," among children. The prominent symptoms of the cases, so called, were:

1. Persistent vomiting.
2. Intense thirst.
3. Prostration.
4. Subnormal temperature.
5. Slow small pulse.
6. Moist skin.
7. Choleraic diarrhœa.

"Acidosis" signifies an excess of acids of the acetone series in the blood. It is well known as a symptom of diabetes and is found in the blood of children suffering from acute infections. It is no more a disease entity than is albuminuria or nose-bleed. The physician who assigns the cause of death as "acidosis" simply acknowledges his ignorance of the real cause of death and gives a symptom which may arise from one of several causative factors. If these cases among children showing intestinal symptoms occurred in the summer time they probably would be called cases of acute infectious ileocolitis.

The laboratory workers of the Boston Health Department examined nasal secretions from about twenty of these cases and were unable to isolate influenza bacilli.

One fatal case showed abundant growth of streptococci. Another fatal case was autopsied by Dr. Oscar Richardson who reported the death as probably due to infection with a microorganism belonging to the streptococcus-pneumococcus group.

Doctor Richardson says:—

"The portal of entrance of these infections we are sometimes reasonably certain of, but in many cases it is but vaguely known, or not known at all. The conditions, however, seem to be as follows:—The mucosæ, or lining membranes, of the nose, Eustachian tubes, middle ears, the gastro-intestinal tract, and the genito-urinary tract, harbor at times—and some of them pretty much all of the time—pathogenic micro-organisms

which, under given conditions, may find congenial soil in these regions, and multiply and increase, producing diseased conditions from the absorption of their toxins or by their entrance into the blood-stream, producing septicæmic infections.

"It is not unusual to find infectious of the mucosæ very common in winters when the temperature ranges from very low to high extremes, accompanied with like changes in humidity and irritating atmospheres. The out-door life of the people, in cities at least, ceases to a considerable degree; they travel more in groups within cars; they attend theatres and other functions, and the general coughing, spitting and sneezing, and personal contact, probably accounts for the spread of the infections, whatever they are. In many of the cases the infection practically confines itself to the mucosæ, and in a short while immunity is established and recovery takes place. In many other cases, however, what are apparently infections of the blood-stream take place, and at times a good many deaths occur.

"As to whether many of these cases are due to some unknown micro-organism, is a fair question. It may be possible, but if so, we are still reasonably sure that certain of the micro-organisms which inhabit the mucosæ may, as so-called secondary invaders, infect the blood-stream and produce death. It is well to remember that although we say we do not know the organism of scarlet fever, yet, in the fatal cases there is usually a profound streptococcus infection. Infections

with influenza bacillus occur, but it still remains to be proved that this organism is as common a source of infection as it is credited with being.

"Much confusion has arisen from the use of the term 'acidosis.' This condition signifies an excess of acids of the acetone series (diacetic and oxybutyric) in the blood. It occurs in diabetes mellitus and is due to the cause of the diabetes,—whatever that is. In other words, 'acidosis' is a condition associated with a disease, the cause of which may be known or unknown. In cases of infection where present, its presence may be due to the profound catabolic changes resulting from infection. It is at least hypothetically possible, of course, to think that the acid intoxication in some cases might be so extreme as to be the final straw in pushing the case over the death border, like the acid intoxication in diabetic coma.

"As a result of the consideration of what I have stated above, I think it is reasonably certain that the majority of the cases in the so-called 'acidosis' epidemics are due to infections with the well-known micro-organisms which inhabit the mucosæ of the body, and that in many of the cases where death ensues it is due to an infection with micro-organisms belonging to the streptococcus-pneumococcus group and septicæmic in character."

"Dr. George P. Sanborn of the Boston City Hospital in a study of specimens from twelve clinical cases found the bacillus of influenza in three. He says:

"The percentage of positive cases in this group corresponds to that found

in the two groups above noted, and clinically diagnosed as influenza. It is therefore a reasonable supposition, not susceptible of proof, that in this group of cases we are dealing with one or more types of influenza.

““In the original cultures, hemolyzing streptococcus, streptococcus viridans, micrococcus catarrhalis, and pneumococcus, all possible causes of respiratory infection, were found. Because of the presence of these possibly pathogenic bacteria, proof that the influenza bacilli found are the causal microorganisms, is impossible. To this end, in these cases or in any other similar group, the demonstration of specific antibodies in the blood of the infected patients is required.””

It seems to the writer altogether probable, in the recent prevalence of sickness, that colds, bronchitis, pneumonia, ileocolitis, acidosis (so called), and influenza have all resulted from the same infection, the variations in the clinical picture being due to differences in resistance of the various persons affected as well as to various sites of infection.

In the vital statistics from December 1 to January 2, 444 deaths were reported to the health department with pneumonia as the principal cause of death. Eighty of these were children under five years of age, 166 were from 60 to 95. So it can be seen that almost 50 per cent. of the deaths were among the young children and the old people. As the contributing cause pneumonia was present in 138 deaths, appearing, for example, in heart disease and nephritis thirty-seven times. The grippe thus seems

to particularly affect the old people. In this period there were 42 deaths from grippe, twenty-five of which were of persons over 60, the oldest being 101, and nine under 5 years. This disease was present as a contributing cause twenty-seven times. Here, again, heart disease and nephritis led, appearing thirteen times as the principal cause in this group. Influenza appeared ten times with pneumonia. As a contributing cause grippe was invariably found in persons over 60 years of age.

MR. J. C. COFFEY, *Worcester*: Mr. Chairman, when I was asked in an informal way by the secretary to relate the experience of Worcester in the prevailing epidemic, I agreed. As the other speakers have stated and the members were all aware, we have no means as health officers of knowing how prevalent this disease may be, because it is not reported to us and the only evidence we have of its prevalence is what we get in the death returns. So I have confined myself entirely to showing the difference between the deaths occurring from these respiratory diseases in 1915 and in this present year for the first three weeks of the year. Worcester unfortunately has had no guardian angel to ward off the epidemic from her, and she has suffered considerably in the number of deaths. The total deaths of the first three weeks of January, 1915, reported to the board of health office, were 147. The total for the first three weeks of this year was 244. Of these total deaths 22 in 1915 were caused by respiratory

diseases, or 14.9 per cent. of the total causes of death. This year 71 were reported from those causes, or 29 per cent. of the total deaths occurring. These were divided in the following way: From acute bronchitis in 1915 there were two, in 1916 six; from bronchial pneumonia, in 1915 nine, 1916 eighteen; lobar pneumonia, 1915 ten; 1916 thirty-six; grippe, 1915 two, 1916 eleven. The total for 1915 was: males 8, females 14, total 22, and the total for 1916: males 39, females 32, total 71. Of the total, 56 were more than 50 years of age, so you can see that the prevalence in Worcester in the causes of death was largely augmented by this present epidemic.

In talking with several of the physicians who have a large general practice, one physician told me that he saw no grippe at all, that his cases were largely colds and pneumonia. Another physician, who has charge of a large private school in Worcester, said his cases were almost entirely tonsilitis, they had no coughs at all, but it was followed by extreme weakness and prostration. And so it went. Most of them said that the grippe was not prevalent, they saw no grippe, but the death-rate shows that something took a large toll in Worcester.

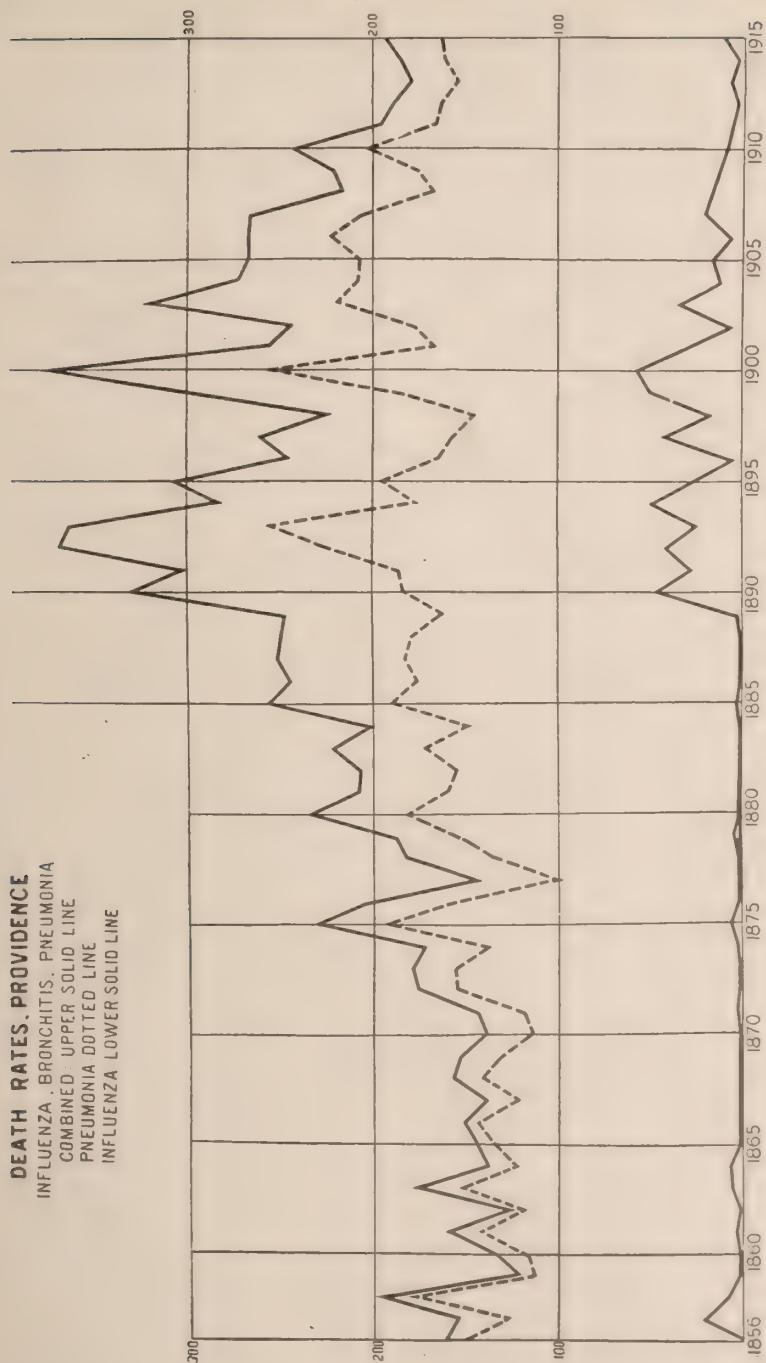
DR. CHARLES V. CHAPIN, *Providence, R. I.*: I greatly enjoyed Doctor Rosenau's very clear statement of the mode in which these diseases are spread, and the very practical advice that he gave in regard to avoiding them. I had hoped that he would be able to give us some more definite knowledge of the causation,

particularly of the disease which we call influenza, but apparently the laboratory workers have not yet been able to arrive at a definite conclusion.

Influenza seems to be like most other diseases. If it strikes in, in a community where it has not prevailed before, most of the cases pursue a typical course, and it is easily recognized. After that, as it comes in epidemic waves, we get a great variety of atypical cases, perhaps owing to the fact that many are in partially immune persons, and perhaps owing to changes in the causative organism itself.

Both Mr. Coffey and Doctor Mahoney spoke about the great variety of forms in which the prevailing epidemic appeared. There are a few of you, probably, who will remember how it appeared in 1889. In Providence it appeared on the 17th of December; it lasted about six weeks, and the great bulk of the cases were very typical. They came on suddenly, often with a chill, with marked headache and very severe muscular pains, and quite a high fever, and accompanied with coryza and cough, bronchial symptoms, and of course great prostration. Recovery was slow. The outbreak reached its climax about the 6th or 7th of January, and the maximum number of deaths, I think, was in the week ending about the middle of January. Then it rapidly disappeared. It seems to me that we must have been dealing then with a real entity, a distinct new disease. I do not mean to say that the type of organism may not have existed in the community before that.

DEATH RATES, PROVIDENCE
 INFLUENZA, BRONCHITIS, PNEUMONIA
 COMBINED: UPPER SOLID LINE
 PNEUMONIA DOTTED LINE
 INFLUENZA LOWER SOLID LINE



What we call grippe may possibly be due to some type of pneumococcus or streptococcus. If so, it certainly was a new strain, which our people were not familiar with and were not immune to. It may be due to the influenza bacillus. At any rate, it seems to me that there was a new disease.

The relation of this disease to pneumonia and bronchitis is illustrated by this chart, which shows the mortality per 100,000 of population in Providence for the last sixty years. Of course, we are very much handicapped in any epidemiological study of these diseases on account of the uncertainty about the diagnosis—this is particularly true in regard to grippe. During epidemic periods we get a great many reports of influenza. During the latter part of the period we get a good many more than we do in the first part, because physicians' attention is called to the disease.

There has been a very considerable change in the last sixty years in regard to diagnosis of pneumonia. There has been a great improvement in diagnosis. According to this dotted line, which represents pneumonia, there was a gradual increase in that disease, also an increase in bronchitis, which was a good deal more than pneumonia. During the period from 1856-86 the increase in these two diseases, which ought really to be classed together, was due chiefly, I believe, to a better diagnosis on the part of physicians. In former years, along back in the 50's and 60's, a great many cases of death that were certified to as old age were really due to pneumonia and today would be

certified as due to pneumonia. I am inclined to think that a good many cases of consumption were then reported to be due to bronchitis. I think there is little doubt that a good many deaths from pneumonia would years ago have been called death from convulsion or death from meningitis.

After careful study of the different causes and their change from year to year during this period it would seem to me that the apparent increase in pneumonia and bronchitis up to about this time—that is, the 80's—was due to a transfer from other causes, and was not probably due to an increase in the prevalence of these diseases. But about that time—that is, in December, 1889,—there was, I believe, a very marked increase. In the five years previous to 1890 the January death-rate was about 75, from the respiratory diseases, and in January, 1890, the first year of the grippe, there were 175. There was a great increase, and it was a real increase, and I think it was probably due to the prevalence of a new disease, influenza. Whether the germ of this disease directly causes pneumonia or predisposes to it I don't know, but something new, some new disease entity, came in, which not only caused death without marked pneumonia symptoms, but caused a great increase of acute pulmonary disease, and you can say that from that time to the present time there has been a correlation between the presence of grippe and the presence of pneumonia. That is brought out particularly in the early 90's, when the diagnosis of this disease on account of its then more

typical character was better than it is now. This correlation not only shows by years, as you can see, but it is shown by months. Usually the epidemic of influenza and gripe does not last much over a month, and during the first eight or ten years if gripe came in January pneumonia, too, increased in January, if gripe came in March pneumonia increased in March.

In the last few years pneumonia has been getting back to its level in the 80's. In the last few years it does not seem to me that we have had much real gripe, gripe of the kind that would cause disease. The first epidemic of that which we have had in Providence for a good many years was in last March and April, and we had quite an increase then in respiratory diseases,

in pneumonia and bronchitis. I think that we had more deaths last March than we are going to have this year in January.

We have heard a great deal about the increase in pneumonia, and its taking the place of the great white plague. I am sorry I did not have a line showing the decrease of tuberculosis, which in the 50's went away up above the edge of the chart and down here began to cross pneumonia, and has since then been lower than pneumonia. But, the apparent increase in pneumonia up to about this period I believe is apparent only. The increase since then, I think, must have probably been due to the presence of influenza, and as the virulence of that disease waned during the last few years our pneumonia has come down to where it was in the 80's.

Discussion.

DR. E. H. PLACE, *Boston*: There are a great many popular superstitions regarding these common infectious diseases that I would like to have discussed. I am greatly interested myself. I know that the scientific evidence is rather slim, and I feel that it would be of very great value to get a number of opinions. Perhaps the commonest superstition is in regard to drafts. Everywhere you see these cases the layman ascribes the disease to some exposure to cold. My own views have always been that chilling of the body was a factor in inducing acute infectious disease of the upper respiratory tract, including pneumonia, and that patients suffering from diseases like measles, laryngeal diphtheria, and diseases which particularly predispose to pneumonia, are made distinctly more susceptible to the danger of pulmonary infection by marked chilling of the body. How this is produced, or whether it really is the result of chilling, is very difficult to say, but it has always seemed to me that if patients are exposed sufficiently, so that the extremities become chilled, the skin becomes

cold, the circulation is disturbed through withdrawing from the surface of the body the amount of blood which ordinarily is there distributed, in order to save the rapid dissipation of heat which they cannot afford to lose, and the resulting congestion of the splanchnic areas, must be a factor in reducing the resistance of the tissues. The layman, however, always looks upon this as a draft, and many of our pneumonia cases which are treated by the open air method cause great anxiety to parents, because they think they are in a draft. They very much object to the windows being opened. Practically, there is no case that I have been connected with which has been treated by the open air method but what the parents have had to be convinced that it was not the draft, it was not the fresh air or the moving air that was dangerous, it was the chilling of the patient.

It appears to me that there is a striking difference between the common infections of the nose and throat and larynx and trachea and infections such as we have been suffering

within the past month and a half, this acute respiratory affection, which is very contagious, and which sweeps through families and institutions, leaving in its wake many cases of broncho-pneumonia and many cases of lobar pneumonia. That opinion, however, has been somewhat shaken by Doctor Rosenau's observations, that there is a striking difference between the ordinary lobar pneumonia which occurs here and there without any particular evidence, certainly not any evidence in my experience, that suggests transmissibility such as measles and diphtheria have, and the transmissibility which is so striking in these acute involvements of the upper respiratory tract.

I should personally be very glad to have some one who is acquainted with them give us the facts in regard to the influence of climate. These diseases particularly occur during cold months. I would like to ask Doctor Rosenau if he has not the facts bearing on the prevalence of these diseases in climates which are more equable than ours, and particularly in regard to the time of year in which they occur in such climates as the Southern States and California, and the relation of climatic influences to the prevalence of these diseases.

The last point which has struck me as of importance in these infections is what we call local resistance. It was spoken of today under adenoids and large tonsils, etc. Certainly in some diseases, like diphtheria, the resistance of the mucous membrane, that is, the invulnerability of the mucous membrane, plays a big part. It is very obvious, I think, to those who are dealing with diphtheria considerably, to notice that if a patient has been suffering from a disease which has made the mucous membrane more vulnerable, exposure to diphtheria is more likely to be followed by that disease. It is equally obvious that when it comes to a disease like measles, the invulnerability of the mucous membrane has nothing to do with it. No matter how free from disturbance the mucous membrane is, an exposure to measles would be followed by that disease if the patient was not immune. The question comes whether these acute respiratory diseases, such as we have been considering, require a special vulnerability of the mucous membrane, such as diphtheria especially requires, or whether they may not be like measles,

which will invade the mucous membrane no matter how normal it may be.

DOCTOR PALMER: Mr. Chairman, I am reminded by several remarks made here about the susceptibility of the mucous membrane to a most interesting address we had before this Association quite a number of years ago on the effects of our superheated houses, due to lack of moisture. I would like to again call the Association's attention to what I think is a very vital fact, and but little recognized, that the reason for our epidemics in the winter is because of the kind of air that is breathed by most people in superheated and dry houses. A man in my office a few days ago said that his wife had had a cold all winter. I said, "Have you got any water in your furnace?" "By Jove," he said, "I have not thought of that for years. There is a place for it, but I have not had a drop of water in it for the last five years. I bet that will help some." I believe, gentlemen, we don't realize how much harm is done from the lack of moisture in our houses in winter. Our mucous membranes become dryer than normal, super-sensitive to these outside influences, and that may be a large causative factor in the increase of these so-called influenzas and grippes.

I don't know that I ever heard any one speak of a peculiar symptom that I associate with grippes. I don't know as it has any value or any meaning, but I have noticed this fact: that when I get the muscles of the eyes lame and aching it corresponds in the early stage with what I choose to call grippes. I have seen it so many times that I regard it as almost pathognomonic of so-called grippes. I give it to you for what you think it is worth.

DR. C. V. CHAPIN: Mr. Chairman, I would like to ask Doctor Place if they had less influenza in their hospitals than occurred in the general population during this outbreak, and if so, to what they attribute it.

DR. E. H. PLACE: *Boston, Mass.*: I have no figures on the incidence in the community. I know that the disease was prevalent in the hospital. It was not more prevalent in the contagious disease department than it was in the main hospital; as a matter of fact, it was less prevalent. We had a smaller number of nurses and a much smaller number of house officers ill at the contagious hospital than in at least two of the larger general hos-

pitals. We had no deaths among those in the contagious department, while there were at least three deaths among the hospital people in two of the large hospitals. I had no case that could be diagnosed gripe on sure evidence. The only cases in which we felt sure at all of the bacteriology were cases of trachitis, and both of those cases showed pure cultures of pneumococcus. One of them occurred in a family in which this so-called gripe had been going on, the other patient having an ordinary attack of respiratory disturbance. This patient developed a marked obstruction to breathing, and came to my attention in that way. The obstruction in this case was due to tremendous masses of dried mucus. The mucus was extremely tenacious, as tenacious as glue. This tenacious mucus was what caused the obstruction. This mucus was just loaded with typical pneumococci with the morphological characteristics, but died before the agglutination test could be done. It was not very viable in cultures. I saw no cases that acted like gripe, and I think that most cases that I saw recovered very rapidly and did not have all the lingering, delayed recovery of strength that we usually associate with real influenza.

DR. M. J. ROSENAU: I may be given a few minutes, perhaps, to make myself a little clearer and to try to answer some of the questions that have been propounded.

First of all, it seems to me that part of the confusion and a certain amount of misunderstanding among those who have spoken this afternoon is due to the fact that we are not discussing one clear-cut disease, but we are discussing more than a group of diseases, we are discussing several groups of diseases. The disease we call influenza, or gripe, is doubtless not a single entity, and certainly the disease we call pneumonia we now know is not a single entity. Furthermore, there is this to be considered. Take any one of these diseases. Take this very one of "gripe." We have gripe in interepidemic years, when it shows no special degree of communicability whatever; it simply smoulders, there is a case perhaps now and then which might be recognized as such. In fact, as we know in Boston, it has been found that there are carriers when we hear nothing of gripe, but those carriers have the bacillus influenza, or symptoms which perhaps could be recognized or would be called influenza

when the disease is epidemic. Then we have times like the present, or more so, like in 1899 and 1890, which I remember very distinctly, when the disease showed not only great virulence, but great communicability. Influenza then was just as contagious as measles; this year it is not quite so bad as in 1889 and 1890. Then we have different degrees of communicability.

Now, we have exactly that same phenomenon with pneumonia. As a rule pneumonia is not very communicable. Nobody would call it a "contagious" disease, like measles or smallpox, nor under ordinary circumstances is it as "catching" as diphtheria or scarlet fever, yet there are times and places (in camps, on shipboard, etc.), when pneumonia shows this same degree of increased virulence and increased communicability. We have such differences, which must be considered, so that I did not mean to compare pneumonia to measles without qualification. I don't think Doctor Place misunderstood me in that way. I only compared it to measles and scarlet fever as examples in that group of diseases in so far as it is communicated in a similar way. The modes of transmission are alike, but the degree of communicability and the factors concerning resistance and immunity of course vary in each one of these diseases, and in each disease itself at different times under different circumstances. Let us consider some of those circumstances that play such an important part.

We regard pneumonia ordinarily as a cold weather disease, because here in this climate it has a distinct relationship to cold weather. If you look at the curve of any city you will see it go up in winter and down in the spring and summer, and up again next year; and it follows such a curve of winter prevalence year after year with considerable regularity. That is a matter of general understanding and general knowledge, although we have pneumonia, and often plenty of it, in warm weather and also in the spring and in the fall. But we cannot consider pneumonia really a cold weather disease, because if you go to the tropics it is much more virulent than it is here. Even in Siberia or in Canada or the coldest countries we know of we find pneumonia to be no more prevalent and more virulent than it is in the tropics under certain circumstances. It may have been a surprise to

most of you, doubtless, to know that the disease which caused the second highest death-rate among the workmen of the Panama Canal was pneumonia. Following the great problem of malaria, so efficiently controlled, was this great question of pneumonia. They had exactly the same problem among the diamond workers in the Rand, which General Gorgas went to South Africa in order to investigate. Now, how did they control pneumonia under those conditions in the tropics? I happen to be familiar with the methods that were in use, and I will not recite all the failures they had. The only way they succeeded in making any impress upon the pneumonia figures under those conditions was to regard it just as a communicable disease, spread just as diphtheria and as measles and as scarlet fever are spread, and to take measures accordingly; in other words, to scatter the people, to prevent crowding. The people brought close together in barracks in close contact with each other, readily contracted pneumonia from each other. When they got them dispersed, scattered, separated; just the one factor of preventing overcrowding helped to prevent the dispersion of this virulent form of pneumococcus and diminished the amount of pneumonia. It was really one of the most wonderful object lessons, and one of the most useful bits of information that we got out of what was otherwise the great and brilliant work of General Gorgas and his colleagues in building the Panama Canal, this question of pneumonia. Gorgas went to the Rand at the request of the British Government and the owners of those great diamond mines, discovered the same factors were in existence there and applied the same principles.

Now, why is pneumonia so much more virulent in the tropics than it is here? It is not because the weather is warm there or the weather is cold here; it is because it has what might be called a virgin soil, an unsusceptible population, to work upon. The people who were brought to Panama to work on that canal came from places where pneumonia does not prevail, and they had no degree of resistance, such as we are all getting

from association and more or less frequent contact with the pneumococcus, which has raised the general level of our resistance to that infection this is a common phenomenon in disease. If you bring in people who are unaccustomed to it, then it is much more virulent with them. We have the same thing with measles. If measles gets into a South Sea island it is a tremendously virulent and fatal disease, whereas with us, with proper care, it is much less virulent.

It seems to me those are the main factors. But we get many other influences, for instance, such as Doctor Palmer recites. He believes that overheated, dry air is especially bad. We hear from somebody else that very cold and chilling weather is especially bad. Somebody else, I think I heard say, that dust is especially irritating. These are bad, of course, but after all they are secondary factors, which I think, depress our vitality or our resistance, so as to make us more susceptible; or if we get pneumonia perhaps we get it in severer form than we otherwise would get it. We only need think of drunkard's pneumonia. A man lying on the street drunk nearly freezes, because we all know the effects of alcohol and how there is a general dissipation of heat, and there is therefore actual chilling of the body, and how common it is to have pneumonia under such circumstances! When a drunkard gets pneumonia it is "good night" with him. I have never seen one recover. And all of us who have had experience in city hospitals have seen a number of such cases. It is the same thing with a person depressed with Bright's disease or other debilitating disease, in which the vitality is altered in just such a way, so that the personal factor here does play a part. The biological factor, the resistance and immunity as we now understand it, plays another very large part. An overshadowing factor is the virulence of the infecting germ. We must not forget the factor of communicability, and for the actual control of these diseases we have to treat them as communicable or contagious.

RECENT ADVANCES IN OUR KNOWLEDGE OF THE INFECTIOUS DISEASES.

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Read before Section on Public Health of Southern Medical Association, on November 9, 1915, at Dallas, Texas

This paper has been prepared for the busy man who, while interested in infectious diseases, has not the time to follow up the literature on the subject constantly. Professor Arkin's contribution will also serve to refresh the memory of those who are actively engaged in health department work of all kinds.

SINCE most of our members are busy medical practitioners, I thought that it might be of interest to discuss some of the recent advances in our knowledge of the etiology of the infectious diseases, especially from the standpoint of their prevention. A conception of the modes of transmission of the infectious diseases is absolutely necessary before we can hope to establish satisfactory preventive measures.

I shall not take time to review the past history of our knowledge of the infectious diseases, but shall present some of the more important recent developments. We are all acquainted with the great work of Pasteur, who demonstrated that fermentation and decay are bacterial processes, and who suggested that our infectious diseases are produced by minute microörganisms. Then came the work of Robert Koch, who placed bacteriology on a firm basis by his discovery of artificial media for the cultivation of bacteria outside the body. This was followed by the discovery of the germs which are the causes of many of our infectious

diseases, as diphtheria, typhoid, tuberculosis, tetanus, anthrax, etc.

But recently, improvements in technique have made possible investigations in entirely new fields. Among these may be mentioned the cultivation of animal tissues in vitro, Abderhalden's work on the defensive ferments, studies on anaphylaxis, the study of filterable viruses of poliomyelitis and rabies, the isolation and cultivation with ease of the spirocheta pallida of syphilis, an anaërobe, and other spirochetes, as well as the protozoa of malaria, and the bacillus of leprosy. Much of this progress has resulted from careful animal experimentation in the laboratory and from the coöperation of the laboratory man with the clinician. With this increased knowledge of the nature of disease and its diagnosis, there has developed a new and distinct specialty, namely preventive medicine. The factors which have contributed the largest share to the development of this new field of work are undoubtedly the ones just mentioned, the advances in bacteriology, followed by the recognition

of the importance of insects in the transmission of disease, animal experimentation, and the study of the filterable viruses.

Let us consider some of the recent investigations which have so greatly contributed to our knowledge of the communicable diseases.

MEASLES.

This disease was the cause of 6,598 deaths in the registration area of the United States in 1910, and is therefore not a necessary incident of childhood. Our knowledge of the etiology of this disease was very incomplete until Anderson and Goldberger demonstrated in 1911 that the disease could be produced in the monkey by inoculation with blood from human cases, provided the blood is taken before or shortly after the period of the eruption. Even the Koplick spots appear in the monkey. The virus was shown to pass through a Berkefeld filter, hence belongs to the group of filterable viruses. It is present in the nasal and buccal secretions up to the time of convalescence when its infectivity disappears. The disease is therefore transmitted by direct contact. Hektoen has transmitted measles from man to man by injection of blood. The desquamated skin does not carry the virus.

These experiments explain the nature of the virus, its entrance into and exit from the body. It has been known that, as a rule, cases are not infective after convalescence is well established. The noninfectivity of the scales is of great importance from the public health standpoint. The great-

est infectivity of measles is very early, generally before the diagnosis has been made. The virus may resist drying or freezing for twenty-four hours. Immunity acquired after an attack is usually absolute. Natural immunity is rare.

SCARLET FEVER.

Scarlet fever was named by Sydenham in 1685. Early in 1911 Cantacuzene and Bernhardt reported the production of scarlet fever in the monkey. These results were also obtained by Levaditi, Landsteiner, and Prasek. The disease produced experimentally seems to be caused by the specific virus of scarlet fever and not by the streptococcus. The work indicates that the virus is present in the tonsils and on the tongue, in the blood and lymphatics. The nature of the virus is at present entirely unknown.

The importance of the disease is realized when we observe that nearly 50 per cent. of all persons have had scarlet fever. In 1910 there were over 6,000 deaths in the registration area of the United States from this disease. The importance of the streptococcus as a secondary invader in scarlet fever is recognized by all, and recently Dick and Henry, working at the Memorial Institute in Chicago, have isolated several microorganisms from the blood and urine of scarlet fever patients. These organisms, some anaërobic, may be of importance in causing the nephritis which so commonly occurs in this disease. The use of vaccine and immune sera for streptococcus and the other microorganisms should be of considerable value in the treatment

and prevention of the complications of scarlet fever, due in large part to the streptococcus. Kessler at the Memorial Institute for Infectious Diseases has demonstrated the presence in the blood of scarlet fever patients of a complement-deviating substance when using as antigen the extract of lymph glands from fatal cases of scarlet fever. The complement deviation occurred in 68 per cent. of the cases. These results suggest the presence of the causative agent in the cervical lymph nodes. The virus is present in the buccal and nasal secretions, which are the usual source of infection.

Scarlet fever may be spread through milk, and several epidemics have been traced to milk infection. Strict isolation and quarantine are at present our best means of prevention. Especially important is the recognition of atypical and abortive cases.

RABIES.

Rabies or hydrophobia is a disease due to an unknown virus present in the central nervous system, and also in the salivary glands, adrenals, and pancreas. The virus produces characteristic changes in the ganglion cells. It enters the body through a bite by a rabid animal, usually the dog. It is carried along the nerve fibers to the central nervous system, thence to the salivary glands. The incubation period is 20 to 40 days, but varies with the location of the bite and nature of the virus. The Pasteur treatment has reduced the mortality rate from 16 per cent. of those bitten to only 0.9 per cent.

The virus of rabies is filterable.

The Negri bodies found in the brain are probably a stage in the life cycle of a protozoan parasite which is the cause of the disease. Noguchi claims to have been able to cultivate the organism in pure culture, and to reproduce the disease.

The Pasteur treatment consists in the injection of attenuated virus obtained by infecting rabbits and drying the spinal cord. It is of no value after symptoms have developed. In such cases the mortality is 100 per cent. Recently Moon has reported satisfactory results in the treatment of rabid dogs with quinine, but others have been unable to verify the findings.

The importance of immediate cauterization of the wound with fuming nitric acid, and of watching the animal for ten to fourteen days, or until symptoms develop, is of course recognized by all physicians.

CEREBROSPINAL FEVER.

(*Epidemic Cerebrospinal Meningitis.*)

The cause of this disease is the diplococcus intra-cellularis meningitidis, or meningococcus, first described by Weichselbaum, in 1887. The organism is found in the spinal fluid. It may also be present in the blood stream, lungs, or joints. The organism is easily killed outside the body. Carriers of this germ have been found and they probably play a considerable part in the spread of epidemics and also explain the occurrence of sporadic cases. The germs in the naso-pharynx reach the meninges and cause cerebrospinal fever, probably by way of the blood stream. They may also involve the sphenoidal sinus.

The disease can be recognized by the characteristic symptoms. In addition, there is usually a leucocytosis of from 25 to 40,000. Spinal puncture is most important in the diagnosis. Increased pressure, with presence of large numbers of cells, increase in albumin and globulin, and the finding of the meningococcus make the diagnosis. Flexner's serum has reduced the mortality from 80 per cent. to 15 per cent.

In the prevention of the disease, isolation of carriers is very important. Secretions of the naso-pharynx should be properly disinfected. Sprays of antiseptics should be used. Vaccination with dead meningococci of persons directly exposed to the disease should be carried out.

SMALLPOX.

Smallpox has been produced experimentally in the monkey. It is the only susceptible animal. In the calf, vaccina develops instead. Hence, vaccina and smallpox are undoubtedly due to the same virus. The nature of this virus is entirely unknown, as also its mode of entrance into the body. The infection may be air-borne to a limited degree. Secretions of the nose and throat are highly infectious and these are probably the chief agents in causing infection. Recently, Noguchi has succeeded in cultivating the virus in the testicle of rabbits, apparently in pure culture. This will greatly facilitate the production of the vaccine virus, and render it more safe from contamination.

WHOOPING-COUGH.

In 1900 Bordet and Gengou reported the observation in sputum of whooping

cough patients of a small organism which they isolated in pure culture six years later. This organism is the *Bac. pertussis*, or Bordet-Gengou bacillus. This organism was constantly present in these cases, and the blood was found to contain an antibody specific for the organism.

Recently Mallory and others have verified the above findings and discovered the presence of large numbers of bacilli between the cilia of the trachea and bronchi. These interfere with the normal action of the cilia and cause an irritation which produces the cough. Mallory has been able to produce the same lesion in young animals with pure cultures of the bacillus. The action of the bacilli is largely mechanical, interfering with the removal of secretions and inhaled particles. The organism also causes a lymphocytosis. The organism is abundant in the early stages of the disease, when it is most communicable. The disease is transmitted by the secretions from the mouth and throat chiefly by direct contact. The microorganism has been noted in dogs and also in cats. These animals may be factors in the spread of the disease.

The infection usually confers an immunity. The pertussis vaccine has been used as a prophylactic measure with some success. In the treatment of whooping-cough the vaccine is of little or no value.

The human race possesses no natural immunity to the disease. Children from six months to six years of age are most susceptible; most cases occur under two years. Girls seem to be more susceptible than boys.

Prevention consists in isolation of infected children and disinfection of nasal and buccal secretions, with vaccination of susceptible individuals.

TYPHOID FEVER.

Although the typhoid bacillus was discovered by Eberth in 1880 and grown in pure culture by Gaffky in 1884, the evidence was not conclusive that this organism was the true cause of typhoid fever. Only recently has all doubt been removed. The proof of the relation of the typhoid bacillus to typhoid fever was furnished by Metchnikoff and Besredka in 1911. They succeeded in reproducing the disease in the higher monkeys. Ordinary laboratory animals are not susceptible.

Blood culture will reveal the presence of the typhoid bacillus in a large percentage of cases. The organism is found in the rose-spots, lymphoid tissue of the intestine, urinary passages and often in the gall bladder. Localized abscesses may complicate the disease and contain the typhoid bacillus. The blood serum gives the specific agglutination reaction, the Grüber-Widal test. However, a positive Widal reaction indicates one of several conditions:

1. An active attack of typhoid fever.
2. A localized infection with the typhoid bacillus.
3. The occurrence of typhoid fever within a period of two to four years.
4. Vaccination against typhoid fever.

A negative reaction does not always rule out typhoid infection, because the reaction does not become positive until the tenth to fourteenth day of the disease. In other cases, the reaction

may disappear for short intervals or be entirely absent. Vaccination produces a positive Widal reaction in about 75 per cent. of cases. However, immunity may be produced without the presence of a positive Widal reaction.

The greatest advance made in relation to typhoid fever has been the demonstration of the prophylactic value of typhoid vaccine. Properly administered, the typhoid vaccine protects against infection as has been shown in all parts of the world. The results may be even better with the use of the sensitized vaccines, suspensions of killed typhoid bacilli treated with immune serum. These cause less marked reactions and greater antibody formation.

One of the problems yet to be solved is the prevention of the development of typhoid carriers, people who may discharge typhoid germs for long periods of time after apparent recovery from the disease. The typhoid carrier is a serious problem when one considers that about four per cent. of all persons having typhoid fever become carriers. Furthermore, there are carriers who have never shown symptoms of the disease, hence cannot be identified except by bacteriological examinations. The organisms are usually located in the gall bladder, and we know that about 20 per cent. of the cases of cholelithiasis give a history of typhoid infection. No satisfactory treatment of these cases has been discovered. Urotropin is of little value. The treatment of the typhoid carrier is the subject of considerable experimental work at the present time.

Much of this work is being conducted with dogs and rabbits, in whom the carrier state can be produced. This is due to localization of the typhoid bacillus in the gall bladder.

TYPHUS FEVER.

Typhus fever appeared in the United States in epidemic form in 1892. Since then very few cases have been reported. That the disease exists in this country has been shown by Anderson and Goldberger who demonstrated that Brill's disease is identical with typhus fever. Blood taken from patients with Brill's disease will produce disease in the monkey. An attack of Brill's disease confers immunity to typhus, and vice versa, hence, the two diseases are identical. The transmission of the disease has been shown to be by the bite of the body louse. The disease has been reported in several large American cities in the past two years. It exists in the mild form.

The etiology of typhus fever is now known. The most recent advance in this line has been the demonstration by Plotz of New York of an anaërobic bacillus in the blood of typhus patients, which produces the same febrile reaction in the guinea pig as typhus blood. He also obtained complement fixation with his bacillus and the blood of typhus patients. In all probability this organism is the cause of typhus. It was not found earlier because of its anaërobic property. Vaccination with this organism may prove to be a valuable preventive measure.

The prevention of typhus consists in:

1. Destruction of all lice.
2. Inoculation with a mild type of the disease (Brill's disease) which confers an immunity.
3. Vaccination with Plotz's bacillus.

ACUTE ANTERIOR POLIOMYELITIS.

This disease was imported from Europe where it has been long endemic. In 1909 Landsteiner and Popper caused the disease in monkeys by inoculation with spinal cord emulsion from a child who died of this disease. Later Noguchi and Flexner reported the cultivation of a minute organism. The organism is contained in the secretion of the nose, throat, and in the intestine, and there are no doubt carriers of the disease. The virus reaches the nervous system through the lymphatics. The virus is so small as to pass through a fine filter. The spinal fluid contains the virus early in the disease.

The organism is easily killed by heat and disinfectants. It consists of small ovoid bodies, 0.15 to 0.3 micron in diameter. The disease has been produced in monkeys with the pure culture. Distemper of dogs may be caused by the same infection. Hence, one should isolate dogs with the disease. Flies should be excluded by screens. Nasal and mouth secretions contain the virus, and should be disinfected. It may also be present in the trachea and small intestines of infected persons. The stable fly may transmit it but is not the usual carrier of the infection.

From the clinical side, this disease should be recognized early, before paralysis has set in. The usual early

symptoms are: sudden restlessness, loss of appetite, temperature of 100 to 103° F. and vomiting. Drowsiness, hyperæsthesia, general weakness, and headache are common. Spontaneous pain, and pain on passive motion are frequent. There are three forms of the disease to be recognized, according to Peabody, Draper, and Dochez. These are (1) type without paralysis, (2) cerebral type with spastic paralysis, and (3) bulbo-spinal, with flaccid paralysis.

PLAGUE.

This disease has been known for centuries, and exists in three distinct forms, the bubonic, pneumonic and septicæmic. *Bacillus pestis* was discovered by Kitasato in 1894. Plague is a disease of rats, ground squirrels and other rodents. It is transmitted by the bite of the flea or by direct contact from one animal to another. The flea infects in a peculiar manner. After feeding on an infected individual it discharges the germs through the intestinal tract. These are deposited on the skin and usually scratched into the tissues. Flies, ants and bedbugs may also transmit the bacillus. The plague bacillus can penetrate the intact skin. In all probability the flea injects bacilli when it bites. The prevention of this disease is entirely a matter of rat elimination, proper isolation of the infected persons and disinfection of all discharges. Haffkine has used a vaccine in the prevention of plague with satisfactory results.

The discovery of plague-infected rats as well as the recognition of human cases at New Orleans, San Francisco, and in several other cities of the

United States already emphasizes the great importance of proper quarantine. This will become even more important when immigration to this country increases after the present European war.

SEPTIC SORE THROAT.

This disease has been recognized only recently, having been confused with acute tonsilitis, or angina of scarlet fever and diphtheria. Its onset is sudden, with headache, backache, and high fever. The tonsils are inflamed and covered by an exudate forming a false membrane. This membrane can be easily removed with a swab. Complications, as peritonsillar abscess and adenitis, are quite common. The disease is produced by the streptococcus and transmitted in milk. Epidemics have been reported in Chicago, Baltimore, and Boston. The milk supply should be carefully investigated in finding the cause of these cases of septic sore throat.

TONSILLAR INFECTIONS.

I have for several years been interested in the relationship of local infections such as tonsilitis to the production of systemic disease. Having been fortunate in working with Dr. E. C. Rosenow, of the Memorial Institute, who has done such brilliant work on the diseases produced by the streptococcus and pneumococcus, I have been specially interested in the tonsil as a source of infection.

Regarding the function of the tonsil, little is known. We understand that it is composed of lymphoid tissue, and normally should act as a filter for

bacteria entering the upper respiratory and alimentary tracts. That the tonsil becomes infected early in life has been demonstrated by the fact that within two weeks after birth there appear large numbers of plasma cells in the tonsil. These plasma cells can be demonstrated in the tonsils of all infants and adults. They indicate the presence of microorganisms in this tissue. That the tonsil should contain bacteria is, of course, evident as the organisms which are present in the throat become lodged in the crypts and remain there. These are in the normal tonsil relatively harmless. When an organism of increased virulence gains its way into the tonsil, there may result the formation of abscesses, or the organism may pass through the lymphoid tissue and gain entrance to the circulating blood.

Of the diseases which gain their entrance to the body by way of the tonsils, we have the following chief examples: Acute arthritis, arthritis deformans, tuberculosis, chorea, appendicitis, gastric ulcer, and, perhaps, also Hodgkin's disease, goitre, scarlet fever, measles, etc. The work of Rosenow has demonstrated the close relationship of the streptococcus group of organisms to the pneumococcus. He has been able to transform the one type of organism into the other by changing the conditions under which they are cultivated. This work is very suggestive of the possibility that many of the infections produced by the streptococcus and pneumococcus group originate from tonsillar or other localized infection. The organism producing a pathological condition in a

locality of the body changes its biological properties. For example, a streptococcus growing on the heart valves acquires certain cultural characteristics which differ from a streptococcus growing in the joints, in the appendix, or in a gastric ulcer. These changes may be due to differences in the oxygen tension or the food supply to these areas.

The close relationship of acute tonsilitis to arthritis, chorea, and endocarditis has been recognized for some time. In fact, a short time ago I isolated from a tonsillar abscess a streptococcus which, when inoculated into a dog, produced the characteristic symptoms of chorea in this animal. That arthritis deformans is produced by the streptococcus can be demonstrated by the fact that this organism can be isolated from the local lymph glands, and, furthermore, vaccines made from these glands are of considerable value in the treatment of some of these cases. The streptococcus has long been recognized as the cause of acute rheumatism, and this disease can be reproduced experimentally in the rabbit and other animals by injection of the streptococcus.

The discovery in the lymph glands of Hodgkin's disease of a diphtheroid bacillus, named by Bunting the *Corynebacterium Hodgkini*, suggests the possibility that Hodgkin's disease may be an acute infection of the cervical glands of the neck occurring through the tonsil. The presence of this organism in a large percentage of the cases of Hodgkin's disease, and the fact that Bunting has been able to reproduce the characteristic pathologic

changes in the cervical glands of the monkey by inoculation of this organism, suggest that the organism may be the cause of this disease.

We have for a long time considered that tuberculosis of the apex of the lung may occur from tonsillar infection, for we know that the tubercle bacillus can enter through an intact mucous membrane, and furthermore tuberculosis of the tonsils is not uncommon. The tubercle bacillus may enter through the tonsils and produce changes in a remote part of the body. Beebe has suggested the possibility that goitre may be an infection produced by some unknown organism which enters through the tonsil. Work along this line is being carried out and the results are not yet conclusive. The tonsil may contain the virus of scarlet fever in an individual suffering from this disease. Extracts of the tonsil in these cases as well as scrapings from the surface will produce the disease when injected into the monkey. Furthermore, complement fixation can be demonstrated with an extract of the cervical glands using the blood of a scarlet fever patient.

We have evidence that toxic substances are produced in the tonsil—substances of a peptone nature. Extracts of tonsils containing the hemolytic streptococcus are especially toxic and produce symptoms very similar to those of anaphylaxis. They cause a marked drop in blood pressure when injected into the dog. These substances may be responsible for the marked anæmia which we find in some patients suffering with acute or chronic tonsilitis.

The above brief review will indicate to every physician the importance of removal of the tonsils when they show evidence of disease, and here I wish to emphasize the fact that a tonsil may be diseased without being enlarged. I have seen tonsils of normal size which contain small abscesses from which I have cultivated a pure culture of hemolytic streptococcus. The removal of the tonsils should not be carried out during an acute attack of tonsilitis, as there is some danger of dissemination of the bacteria with serious results. We have in the tonsil a good example of an organ whose function it is to protect the body against the invasion of bacteria, but which very often acts as a storehouse for bacteria and disseminates them throughout the body. Time will not permit mention of the other local infections which may be the source of arthritis and the other diseases produced by the streptococcus. Infections of the roots of the teeth, infections of the gall bladder, chronic appendicitis, infections of the sinuses, or chronic otitis media, etc., may produce an arthritis or a toxic neuritis in a very similar manner.

The drug treatment of these streptococcus infections is not very satisfactory. We know that the synthetic salicylates are as valuable in the treatment of these conditions as the natural product. But neither of these has any specific action toward the streptococcus. They undoubtedly relieve the symptoms, but the treatment consists in removing the local source of infection, thus preventing serious

complications, and the use of auto-genous vaccines whenever indicated.

DIPHTHERIA.

The bacteriology of this disease is well known to all. The most important recent advances in our knowledge of this disease concern the diagnosis and treatment. The recent discovery of a local cutaneous reaction by Schick will be of considerable value in determining the susceptibility of individuals to the disease. The Schick test consists of the injection of a minute quantity of diphtheria toxin (1/50 M. L. D. dose) intracutaneously. If a local reaction occurs, then the individual's blood does not contain sufficient antitoxin to neutralize the toxin injected. In other words, the individual has no immunity, or is susceptible to the infection. Individuals who are immune, either as a result of a recent attack of the disease, or the passive immunization with antitoxin, give no reaction. Diphtheria carriers, persons who harbor virulent diphtheria germs in the throat but themselves present no symptoms, also give a negative Schick reaction. We have here the explanation of the development of such carriers. They are individuals who have become actively immunized¹ against the effects of the toxin by the formation of antitoxin in the blood, but they harbor living diphtheria germs in the throat or nose.

This simple Schick test is therefore of considerable value in determining:

1. Who shall be given antitoxin in

¹It has been estimated that an individual giving a negative reaction has at least 1/30 unit of antitoxin per c.c. of blood.

an epidemic of diphtheria (people with positive reaction),

2. Locating diphtheria carriers who are produced about every case of diphtheria (people with negative reaction but with germs in the throat),

3. Duration of immunity produced by antitoxin injection (usually only 1 to 2 months).

In connection with the antitoxin treatment it should be emphasized that in severe cases large doses should be given intravenously to obtain the best results. The antitoxin should be given as early as possible. As a prophylactic measure the value of antitoxin is unquestionable.

The problem of the "diphtheria carrier" is a difficult one. No diphtheria patient should be released from quarantine until two negative cultures taken two days apart are obtained. Giving of antitoxin does not prevent a person from becoming a carrier. The antitoxin neutralizes the toxin but does not kill the bacteria. To eliminate the carrier state many procedures have been tried, among them vaccination with killed diphtheria bacilli and spraying with *Staph. aureus* cultures. Sprays of $\frac{1}{4}$ to 1 per cent. of formalin have been recommended. Even more recently, Hektoen has found that kaolin, when sprayed on the mucous membranes, causes rapid disappearance of the diphtheria bacilli.

HODGKIN'S DISEASE.

The work of Reed and Longcope has shown that this disease is independent of tuberculosis. Of late years Hodgkin's disease, or malignant lymphoma,

has been regarded as of infectious nature. In 1900 Fränkel and Much reported the presence of non-acid-fast tubercle bacilli in the glands in Hodgkin's disease. This was followed in 1913 by the successful cultivation by Negri and Mieremet of an organism belonging to the diphtheria group and resembling the one described by Fränkel and Much. This work has been followed by the results of Bunting and Yates who have verified the above findings. The organism is a pleomorphic diphtheroid organism, gram positive, non-acid-fast. Bunting has suggested the name *Coryne-bacterium Hodgkini* for this organism. The presence of the organism in the lymph glands and the fact that Bunting has recently reproduced the characteristic changes in the cervical glands of the monkey with a pure culture suggest that it may be the cause of the disease. I have recently isolated this pseudo-diphtheroid organism in pure culture from a very rapidly progressing case of Hodgkin's disease, and used a vaccine from the organism. We can hope for a specific treatment in the disease in the near future, and a knowledge of its mode of entrance into the human body.

However, the presence of pseudo-diphtheroid organisms as saprophytic bacteria on mucous membranes, their demonstration in lymphatic glands in various pathological conditions as well as in apparently normal glands, and

the great variations in their cultural characteristics make the cause of Hodgkin's disease still uncertain.

Time will not permit me to discuss the great advances in our knowledge of tuberculosis, pneumonia, tetanus, syphilis, and the other infectious diseases, as well as pellagra¹ which may be an infection. The recent work of Maude Slye on the importance of heredity as a predisposing cause of cancer, the demonstration that the tendency to cancer is a transmissible character, is of great interest and importance. Whether cancer is infectious remains to be determined, although the above-mentioned work renders this very unlikely. Our knowledge of the leukæmias and anæmias is still very incomplete. Some of these may be of an infectious nature. Proper treatment, as well as preventive measures, are dependent upon the discovery of their cause.

From the brief summary which I have presented it is evident that definite progress is being made in our knowledge of the infectious diseases, but we have failed to make use of much of this knowledge in prevention. The foundations have been laid for the science of preventive medicine. Let us help to make the structure the greatest monument contributed by the human race.

¹Goldberger has just demonstrated that Pellagra can be produced experimentally in the human subject by a restricted diet.

TESTS OF A NEW PROCESS OF SEWAGE PURIFICATION WITH GREASE RECOVERY AND APPARENT PROFIT.

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The title of this paper well describes the scope of an important contribution to our rapidly advancing knowledge of sewage disposal.

IN JANUARY, 1915, at the Massachusetts Institute of Technology, in an address before officers and students of the Biological Department, Mr. E. S. Dorr, a graduate of the Institute and an engineer, described experiments which had been made from 1911 to 1914, under his direction at the Calf Pasture pumping station of the Boston Main Drainage works, to determine the feasibility of a process of sewage treatment, invented and patented by Mr. George W. Miles, Ph. B., a Boston chemist. This process may be described as follows:

Ordinary sewage sludge from settling basins is greasy and offensive, and of so little practical value that farmers will not accept it for fertilizer, even as a gift, yet sewage sludge contains fertilizing elements of great value and considerable grease. The Miles process attempts, by the addition of an acid, to precipitate the bulk of the solids from sewage in the form of a sludge which can be dried and degreased, thereby producing a readily salable and greaseless fertilizer, as well as recovering the valuable grease. Either sulfuric acid or sulfurous acid may be used and the process contem-

plates the manufacture of the acid at the disposal works. If sulfuric acid were chosen, ordinary weak chamber acid of 1.53 specific gravity would be used, but the cheapest source of acid is undoubtedly pyrite (native FeS_2), which when roasted in a furnace of proper construction, produces sulfur dioxide (SO_2). This is a gas which may be fed directly into the sewage, in which it would dissolve, forming sulfurous acid.

The addition of sulfur dioxide precipitates most of the grease, together with the greater part of the suspended matter. The resulting sludge is dried, extracted with a solvent to recover the grease and the remainder prepared for fertilizer. An important sanitary feature of the treatment is that the sulfur dioxide is a strong disinfectant, so that the acidified sewage contains few bacteria. It also contains but little suspended matter. Consequently the supernatant liquid may be discharged into a body of water like Boston Harbor without producing any nuisance.

Mr. Dorr's Experiments.—Experiments conducted by Mr. Dorr and other officers of the Sewer Division of the City of Boston were made at

different times between June 20, 1911, and June 29, 1914. Their results as reported to us are given below. In all, eleven runs were made at different times during the four years covered by the experiments, and 25,986 gallons of sewage were treated. From these experiments, Mr. Dorr concluded that he could obtain from 1,000,000 gallons of sewage 1,738 lbs. of dry sludge containing 21.7 per cent. of grease, which at 4 cents a pound would yield \$15.08 per million gallons. In addition, there would be 1,361 lbs. of fertilizer base produced per 1,000,000 gallons of sewage, which was estimated by him according to agricultural standards to be worth \$13.59 a ton, or \$9.25 per million gallons, making the total value of the recoverable materials about \$24.33 per million gallons.

In the following table are summarized the results of Mr. Dorr's experiments:

MR. DORR'S EXPERIMENTS, BOSTON
MAIN DRAINAGE WORKS,
1911 TO 1914.

A. With Sulfuric Acid.

Total sewage treated with sulfuric acid, gals.....	14,264
Average sewage treated per test with sulfuric acid, gals.....	3,566
Amount of dry sludge precipitated per million gallons, lbs.....	1,809
Average grease in sludge.....	20.31%
Average grease in sludge—pounds per million gallons sewage.....	393.2
Average moisture in dried sludge....	5.62%
Average ammonia in sludge.....	3.32%
Average ammonia in sludge—pounds per million gallons.....	63.6
Average number of bacteria in sewage at 20° C., per c.c.....	4,340,000
Average number of bacteria in sewage at 37.5° C., per c.c.....	8,460,000

Average number of bacteria in effluent at 20° C., per c.c.....	827
Average number of bacteria in effluent at 37.5° C., per c.c.....	1,800

B. With Sulfurous Acid.

Amount of sewage treated with sulfurous acid, gals.....	6,318
Average amount of sludge per million gallons, lbs.....	1,975
Average amount of sludge per million gallons, dry, lbs.....	1,814
Average grease in sludge.....	22.33%
Average grease in sewage—pounds per million gallons.....	436
Average moisture in dried sludge....	8.17%
Average ammonia in sludge.....	3.64%

Tests by the Sanitary Research Laboratory, M. I. T.—Mr. Dorr's experiments gave results so full of promise, even though they did not touch the sludge drying and degreasing problem, that their repetition under the supervision of impartial investigators and for a longer period, was thought well worth while. Accordingly, arrangements were made with the approval of the Hon. James M. Curley, mayor of Boston, for a week's study of the process under the supervision of the Sanitary Research Laboratory of the Massachusetts Institute of Technology, and July 7, 1915, was selected as the date of beginning.

Description of Experimental Devices.—The accompanying photograph illustrates the experimental devices employed, which may be described as follows:

The devices consisted of two wooden settling tanks, a trough for mixing the acid and sewage, a supply pipe for raw sewage and devices for applying sulfur dioxid gas to the water.

The sewage was brought from the grit chamber located at the head of the

conduit leading to the Moon Island siphon, through a $1\frac{1}{2}$ -inch pipe leading to a barrel, in which a constant head was maintained by means of an overflow. The sewage was conveyed from the regulating barrel to a box about one foot square in plan, from which it flowed through a $1\frac{1}{2}$ -inch outlet pipe into the first settling tank. At a point 3 ft. 4 in. beyond the inlet of the pipe the sulfur dioxide gas was introduced. The gas was added directly to the sewage through a rubber tube leading from a tank in which liquefied gas was stored under pressure.

The treated sewage flowed through a covered wooden trough 2 ft. by 3 ft. in cross section, and fitted with baffles

to insure good mixing, to the first settling tank.

Settling tank No. 1 was built of wood. It was 15.3 feet long, 3.02 feet wide and had a depth of 3.98 feet to the flow line. Its capacity was 1,352 gallons. This tank had two outlet pipes, one at the flow line and another extending 11 inches above the floor. The higher outlet connected with settling tank No. 2.

Settling tank No. 2 was of the same construction and area as tank No. 1, but its depth was only 3.61 feet, corresponding to a capacity of 1,227 gallons below the flow line. The sewage from tank No. 1 entered tank No. 2 at a point 6 inches above the bottom and escaped at the other end through a skimming overflow, discharging the treated sewage from a point about 6 inches below the surface of the tank.

Personnel.—The experiments were directed by the writer, assisted by Messrs. A. L. Gammage, C. D. Bryant and C. D. Gookin and during part of the work by L. P. Geer, T. R. Kendall and P. Masucci, with advice from time to time by Mr. Dorr and Mr. Miles. The Director of the Sanitary Research Laboratory, Prof. Wm. T. Sedgwick, has been constantly in consultation.

Methods.—The amount of sulfur dioxide gas added was determined by frequent weighings of the tank from which the gas was supplied, and by noting the acidity of the treated sewage from time to time, usually every half hour. The acidity of the treated sewage was measured at the inlet and outlet of tank No. 1 and



at the outlet of tank No. 2, respectively. It was determined by titrating with standard alkali, using methyl orange as indicator.

Description of Experiments.—Beginning at 1 p. m., July 7, a continuous test of the process was made until 3.22 p. m., July 14, when the supplies of sewage and gas were stopped, the sewage decanted from the sludge and the latter measured and dried. At the conclusion of the run, the sewage from both tanks was allowed to drain away slowly so that a settling period of over $3\frac{1}{2}$ hours was given to the last sewage treated. At 7 p. m., the sewage had drained to a point 11 inches above the floor. The remaining sewage and sludge were allowed to stand until 9 a. m., July 15, and the tank was then drained through screens until all the water practicable to remove by draining had run off.

The sludge in both tanks was then well mixed and sampled, and the contents of tank No. 2 were added to tank No. 1. There were 76.5 pounds of sludge in tank No. 2 and 6,485 pounds in tank No. 1. The sludge was of a dark gray color and about as thick in consistency as would run through pipes easily. The coarser material in the sludge was deposited near the inlet end of tank No. 1.

Samples.—Twenty-four hour composite samples, made up of half-hourly samples, were taken from the raw sewage, the effluent from settling tank No. 1, and the effluent from settling tank No. 2, respectively. These samples were analyzed with the results given in the accompanying tables.

Sludge Drying Experiments.—At 3 p. m. on July 15, the mixed sludge

from tank No. 1 and tank No. 2 was placed upon a cinder bed to a depth of 6 inches, and the same sludge, dried, was removed on July 22—seven days thereafter.

At 12 o'clock, noon, on July 16, mixed sludge from tank No. 1 and tank No. 2 was acidified with 0.1 per cent. of sulfuric acid (the percentage being based upon the weight of wet sludge) and placed upon a cinder bed to a depth of 3 inches; and this sludge, dried, was removed on July 19—three days thereafter.

At noon on July 16 another portion of the above mentioned acidified sewage was applied to a cinder bed to a depth of 9 inches and the dried sludge removed on July 26—ten days thereafter.

A charge of 12 gallons of the acidified, mixed sludge was dried in a steam-heated, rotary dryer furnished by the Wheeler Condenser & Engineering Company. A charge of 12 gallons was dried in an hour, and about four pounds of steam at approximately 45 pounds pressure were used to heat the dryer. The mechanism of the dryer was driven by a belt from a small vertical engine and 36 pounds of steam at approximately 45 pounds pressure were used by this engine. A second charge of 9 gallons of the same sludge was used and dried in the same way in 50 minutes, but no better results were obtained. No figures for the cost of drying were furnished or are available, because the quantity of sludge would be too small upon which to base accurate estimates.

November Experiments.—The results of the first test, in July, showed the sewage to contain a somewhat lower

fat and sludge content than appeared in the experiments made by Mr. Dorr. The reason for this was apparently an abnormal rainfall which occurred just before and during the test, namely, on the 2d and 8th of July. This resulted in a flow of sewage averaging 116,302,000 gallons per day, as shown on the accompanying plot, whereas the average annual discharge of sewage at the Calf Pasture is but slightly over 100,000,000 gallons per day.

It was accordingly thought unsafe to base final conclusions as to the correctness of Mr. Dorr's data upon the July experiments alone, and accordingly a check experiment of three days' duration was arranged to begin on November 8. This time the discharge of sewage at the Calf Pasture was found to be below the average, namely, 77,890,000 gallons daily.

The November experiments began at 3 p. m. on November 8 and continued for 72 hours, exclusive of stoppages. From 5.23 p. m. to 5.45 p. m., and 5.55 to 8.17 p. m. on November 8, the experiment was interrupted for the making of some repairs. Again on November 9 the experiment had to be stopped between 5.35 and 7.02 a. m. because the liquefied sulfur dioxide got so cold that it could not be fed from the tanks into the stream of sewage fast enough. The test was, therefore, extended for a period corresponding to the time taken out for repairs and because of lack of gas, but was brought to a conclusion at 7.11 p. m. on November 11.

On one or two occasions during the test, the effluent from the settling tank was slightly alkaline, because of insufficient gas having been added. In

other respects, the experiment was conducted like that made in July.

During this test the discharge of sewage at the works was as follows:

<i>Date.</i>	<i>Gallons per Diem.</i>
Nov. 8.....	76,065,811
Nov. 9.....	84,120,818
Nov. 10.....	77,055,221
Nov. 11.....	74,319,242

Samples.—Samples of sewage and tank effluents were collected daily, the samples being made up of half-hourly portions like those collected in July. Samples of wet sludge were also collected, but as no sludge-drying experiments were made at this time, no samples of dried sludge were taken.

Results.—The results of analyses of daily samples of raw sewage and the effluents from tanks 1 and 2, respectively, for the seven days of the test are given on the accompanying analysis sheets. In addition to these, composite analyses were made of the daily samples collected for the first four and the last three days of the test, respectively. The composite samples were analyzed somewhat more completely than the daily samples, as the results show, and the results of analyses are given beyond.

Excess Acidity.—An excess of acid was added to the sewage at all times; otherwise the sludge would not precipitate. In general terms this excess must amount to about 10 per cent. of the total acid added. The average amounts of acid added each day, both during the July and the November experiments, are given in the following tables. These tables show that in July the effluent from tank No. 1 contained on the average an excess of 55.9 parts of SO_2 per million, and in Novem-

EXCESS ACIDITY, JULY 7-14, 1915.

Period.	Sulfur dioxide parts per million.	
	Tank No. 1 effluent.	Tank No. 2 effluent.
1st 24 hours.....	25.6	....
2d 24 hours.....	68.8	83.5
3d 24 hours.....	50.2	57.6
4th 24 hours.....	79.0	63.0
5th 24 hours.....	....	....
6th 24 hours.....	68.5	56.6
7th 24 hours.....	42.6	51.8
Average.....	55.9	62.5

EXCESS ACIDITY, NOVEMBER 8-11, 1915.

Period.	Sulfur dioxide parts per million.	
	Tank No. 1 effluent.	Tank No. 2 effluent.
1st 24 hours.....	20.7	20.7
2d 24 hours.....	17.0	12.6
3d 24 hours.....	28.6	30.4
Average.....	22.1	21.2

ber the effluent from the same tank contained an excess of only 22.1 parts of free acid per million. In July it was believed that an unnecessary excess of acid was added and consequently during the November experiments the excess was reduced as much as the rather crude apparatus for adding the acid would permit. As the result of the attempt to reduce the amount of acid in November, on two occasions the effluent from the settling tank became slightly

alkaline. Nevertheless, it is believed that on an average an excess of acid not exceeding 35 parts of SO_2 per million may be used to bring about the optimum degree of sludge precipitation.

Volume of Sewage.—The following table shows the number of gallons of sewage treated daily, and also the amount of sulfur dioxide gas used daily. The table shows also the total period of subsidence in both tanks. No allowance was made for imperfect displacement in the tanks. The figures represent the capacity of the tanks in terms of hours flow. Tank No. 1 removed the bulk of the sludge, namely, about 78 per cent. of that removed by the two tanks in series.

TABLE SHOWING VOLUMES OF SEWAGE, AMOUNTS OF ACID AND PERIODS OF SUBSIDENCE, JULY 7-14, 1915.

Period.	Gallons per day.	Pounds of SO_2 gas added.	Sulfur dioxide.		Total settling period hours.
			Lbs. per million gallons.	Parts per million	
1st 24 hours	9,057	16.094	1,776	212.9	6.83
2d 24 hours	8,727	13.969	1,600	191.8	7.09
3d 24 hours	7,612	14.956	1,965	235.6	8.13
4th 24 hours	7,805	16.350	2,096	251.3	7.93
5th 24 hours	7,749	15.819	2,041	244.7	7.99
6th 24 hours	8,710	17.063	1,959	234.9	7.11
7th 24 hours	8,030	15.575	1,940	232.6	7.71
Average..	8,241	15.689	1,911	229.1	7.54

Results of Sludge Analyses.—The results of analyses of the wet sludge collected from tanks No. 1 and No. 2 during the July and November experiments, respectively, are as shown below. The weighted average result of the two experiments is as follows:

QUANTITIES AND COMPOSITION OF
SLUDGE.

Moisture in wet sludge.....	85.80%
Fats in dried sludge (by ether).....	22.66%
Pounds of wet sludge per million gallons..	13,400
Tons of wet sludge per million gallons..	6.720
Parts of wet sludge per million.....	1,612
Pounds of dry sludge per million gallons	1,909
Tons of dry sludge per million gallons..	0.9545
Parts of dried sludge per million.....	228.9
Pounds of grease per million gallons...	430.1
Tons of grease per million gallons.....	0.2151
Parts of grease per million (in sewage)...	51.6
Average total gallons treated per 24 hours.....	7,890
Average pounds of sulfur dioxid used per million gallons.....	1,961
Average parts of sulfur dioxid per million	235.1
Average detention period—hours.....	7.72

RESULTS OF SLUDGE DRYING EXPERI-
MENTS, JULY 1915.

Sam- ple No.	Description of sample.	Substance determined.	Percent- age of sub- stance.
3929	Sludge from Tank No. 1	Moisture	79.94
		Fats in dry sludge (by ether)	22.5
3930	Sludge from Tank No. 2	Moisture	93.88
		Fats in dry sludge (by ether)	21.5
3931	Mixed sludge from shallow depth bed—3-in. sludge	Moisture	54.99
		Fats in dry sludge (by ether)	17.5
3932	Mixed sludge from medium depth bed—6-in. sludge	Moisture	52.75
		Fats in dry sludge (by ether)	16.4
3933	Mixed sludge from steam dryer	Moisture	22.27
		Fats in dry sludge (by ether)	15.6
3955	Mixed sludge from deep bed—9-in. sludge	Moisture	60.03
		Fats in dry sludge (by ether)	15.74

*Results of Sludge Drying Experi-
ments.*—The mixed sludges from tanks
No. 1 and No. 2, respectively, were
dried in various ways, as described

above. The moisture and fat in the
sludges after drying at different depths
for different periods are shown in pre-
ceding table.

The sludge in the 3-inch bed and
that used in the steam dryer were acidi-
fied with 0.1 per cent. of sulfuric acid
before drying.

The specific gravity of the wet sludge
was 1.036 and it contained only 81.6
per cent. of water at the time it was
mixed and applied to beds and dryer.
An unusual dryness of the sludge
from this acid process is noteworthy.

*Comparison of Sanitary Research
Laboratory Experiments with Mr. Dorr's
Experiments.*—In the following table
are given the results which are com-
mon to both investigations:

COMPARISON OF AVERAGE RESULTS OF
TREATING SEWAGE WITH SULFUR-
OUS ACID, AS SHOWN IN EXPERI-
MENTS BY E. S. DORR AND M. I. T.
SANITARY RESEARCH LABORA-
TORY, 1912-1914 AND 1915, RE-
SPECTIVELY.

	Experi- ments by E. S. Dorr.	Experiments by M. I. T. San. Res. Laboratory.
Average daily flow of sewage during experiments, gal- lons.....	92,514,647	103,498,049
Average amount of dry sludge per million gallons of sewage.....	1,814	1,909
Average percentage of grease in dry sludge.....	22.33	22.66
Average amount of grease precipitated from sewage, pounds per million gallons	436	430.1
Average amount of sulfur dioxid used, in pounds per million gallons.....	2,300*	1,963

*Approximate.

The close agreement between the results of the two sets of experiments is remarkable. During the experiments by the Sanitary Research Laboratory a larger amount of sludge was recovered, but a smaller amount of grease per million gallons of sewage. On the other hand, the percentage of fat determined by both sets of observers was approximately the same. The mean flow of sewage during the Sanitary Research Laboratory experiments was about 11 per cent. higher than the average flow of sewage during Mr. Dorr's experiments. It may be definitely stated, therefore, that the experiments of the Sanitary Research Laboratory confirm the results obtained by Mr. Dorr regarding the amount of sludge which may be recovered from Boston sewage and the amounts of grease which are present therein.

Discussion of Results.—The Miles acid process has thus been shown to possess many advantages as a method of sewage disposal for cities like Boston, namely:

1. It disinfects the sewage by reducing the numbers of bacteria from millions to hundreds per cubic centimeter.

2. If the drying of the sludge and the extraction of the grease can be accomplished economically, it is probable that a large part if not all of the cost of the acid treatment may be met by the sale of the grease and fertilizer recovered from sewage.

3. The use of so strong a deodorizer and disinfectant as sulfur dioxide would prevent the usual nuisance of treatment works. The experiments have shown that the sludge can be held

at the works for four days during the heated season without giving off offensive odors, while the effluent is inoffensive and stable enough to be discharged into Boston Harbor without the slightest probability of creating a nuisance.

4. The addition of sulfur dioxide to the sewage also avoids any fly nuisance which is a handicap to the operation of Imhoff tanks and trickling filters. This fact, with the absence of odor, would be a great advantage to any plant located at Moon Island, and would probably cause a great appreciation in value of the surrounding property.

It will be noticed that the amount of fat in the sludge, 430 pounds per million gallons, amounts to 51.7 parts per million, while the amount of fat determined in the sewage was only 36.8 parts per million. The explanation lies in the fact that the slow action of the acid decomposes the soaps which were not dissolved by ether when the raw sewage was examined. Furthermore, the samples of sewage tested did not contain a fair proportion of the large particles of fatty matter, all of which were included in the sludge. These results may be criticized as high, but the determinations have been repeated many times with practically the same result, and it is the presence of this percentage of fat in the sludge,—much larger than the amounts hitherto determined by other observers,—which, among other things, makes the proposition well worth considering for the disposal of Boston sewage. It must also be borne in mind that the acid treatment decomposes the soaps, mak-

ing it possible to recover from the sludge fats which are released from the soaps and which could not be readily extracted from the sewage were no acid used.

For large works in practice, it is proposed to produce acid by roasting pyrite (iron sulfide) which process burns out the sulfur from the pyrite with the production of sulfur dioxide. This latter would have to be dissolved from the gases issuing from the pyrite furnace by saturating part of the sewage and adding the part so treated to the remainder. For the treatment of sewage, about 1,900 pounds of sulfur dioxide would be required per million gallons.

Storage of the treated sewage in tanks would effect the removal of about 60 per cent. of the suspended matter in the form of sludge. This sludge would then have to be dried, the grease extracted by the naphtha or some other solution process and the extracted sludge sold as fertilizer base.

Economical drying of the sludge and the extraction of the grease is absolutely essential for the success of the process. Mr. Dorr's figures, which show profits of from \$6.00 to \$11.00 per million gallons, appear high and it is possible that Mr. Dorr has allowed too little, both for the amount of acid and for the cost of drying the sludge. For example, Mr. Dorr estimates that 1,000 pounds of sulfur dioxide would be required per million gallons of sewage, while our experiments show that the amount required would be nearer 2,000 pounds, thus raising Mr. Dorr's estimate of the cost

of the acidification from \$6.00 to \$10.00 per million gallons. But even if Mr. Dorr's figures for acidification, drying and degreasing be doubled, that is increased from \$12.00 to \$24.00 per million gallons, the process is well worthy of consideration by the city of Boston because of its freedom from nuisance, and because it produces an effluent, practically free from disease germs, which can be discharged into the harbor with impunity.

Conclusion. — In conclusion, the writer would state that he finds in the Boston sewage as much sludge and as much grease as Mr. Dorr found previously. With the facts at hand, the process would be very satisfactory for Boston from a sanitary standpoint and is more promising economically than any other known. The value of Imhoff tank sludge is hardly enough to pay for the drying; at Milwaukee, Chief Engineer Hatton estimates the total value of activated sludge at from \$9.00 to \$15.00 a million gallons, while our Boston experiments have proved that the sludge from the Miles process, although less in bulk than that from the activated sludge process, has a value of more than \$24.00 per million gallons of sewage. Correcting Mr. Dorr's estimates for the higher amounts of acid which these experiments show to be necessary, one gets \$18.00 per million gallons as the average cost of treatment, and \$6.00 as the margin of profit. While it is believed that this estimated margin of profit is too high, the writer is unable, by any reasonable comparison with analogous cost data from other sources, including his experience, to wipe it out. Further-

more, the large size of the Moon Island plant and the tanks already in existence there are all in favor of a reduced rather than an increased cost of treatment.

Accordingly, making every allowance which can be made with the information which the science of sewage disposal affords at the present time, the process appears still so promising from a sanitary standpoint and so attractive economically that an experiment on a large scale to settle all question of doubt has been recommended to be made by the city of Boston.

SUMMARY OF RESULTS AND ANALYSES..

JULY EXPERIMENTS.

Sludge from Tank No. 1:

Moisture.....	79.94%
Fats (by ether).....	22.5%
(On dry sludge.)	

Sludge from Tank No. 2:

Moisture.....	93.88%
Fats (by ether).....	21.5%
(On dry sludge.)	

Pounds of wet sludge.....	648.5
Pounds of wet sludge per million gallons..	11,280
Tons of wet sludge per million gallons..	5.640
Parts of wet sludge per million.....	1,353
Percentage moisture of mixed sludge (weighted average).....	81.58%
Pounds of dry sludge.....	119.5
Pounds of dry sludge per million gallons	2,080

Tons of dry sludge per million gallons..	1.040
Parts of dry sludge per million.....	249.2
Percentage grease of mixed dried sludge (weighted average).....	22.38%
Pounds of grease.....	26.73
Pounds of grease per million gallons....	465.3
Tons of grease per million gallons.....	.2327
Parts per million of grease in sewage...	55.8
Total gallons of sewage treated.....	57,440
Total pounds of SO ₂ used.....	109.82 lbs.
Total pounds of wet sludge.....	648.5
Total detention period, hours (2 tanks)	7.54

NOVEMBER EXPERIMENTS.

Sludge from Tanks Nos. 1 and 2:

Moisture.....	92.18%
Fats (by ether).....	23.08%
(On dry sludge.)	

Sludge from Tank No. 2:

Moisture.....	94.77%
Fats (by ether).....	24.88%
(On dry sludge.)	

Pounds of wet sludge per million gallons.	18,910
Tons of wet sludge per million gallons..	9.455
Parts of wet sludge per million.....	2,267
Pounds of dry sludge per million gallons	1,479
Tons of dry sludge per million gallons..	0.739
Parts of dry sludge per million.....	177.3
Pounds of grease, soluble in ether, per million gallons.....	341.3
Tons of grease, soluble in ether, per million gallons.....	0.171
Parts per million of grease soluble in ether.....	40.91
Total gallons of sewage treated.....	22,720
Total pounds of SO ₂ used.....	47.47 lbs.
Total pounds of wet sludge.....	429.5
Total detention period, hours (2 tanks)	8.17

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HEALTH INSURANCE.

Sickness insurance, or to give it a title more in keeping with the spirit of modern public health, health insurance is claiming a large and increasing share of public attention. The Massachusetts, New York and New Jersey legislatures have before them bills which provide for legislation dealing with this subject. The American Association for Labor Legislation has been incubating a plan for health insurance for some three years and has drafted a "model law" which is the basis of the bills now pending. This bill has been offered to certain state legislatures before but never with such strong backing as this year. At the last meeting of the Labor Legislation Association in December, 1915, health insurance was the principal theme discussed. Moreover, the report of the United States Industrial Relations Commission, which is only a few months old, urged the adoption of a scheme of compulsory health insurance not unlike that recommended by the Association for Labor Legislation.

Obviously, health insurance is another step in the process of bringing to pass a condition wherein society shall bear, distributively and immediately, the loss which must ultimately fall upon it. It is another step in the socializing process which is going on in America as surely as the years themselves.

The scheme that is now being seriously considered in three of our state legislatures and which is sure to be introduced in a number of others next year involves the following as its outstanding features:

1. Compulsory insurance for all wage earners receiving less than \$1,200 per year.
2. Voluntary participation in the plan for others who so desire.

3. Benefits:

- a. Medical and surgical attendance, nursing attendance for not exceeding six months in any one year and surgical supplies during the same time not over \$50.
- b. A cash benefit during incapacity for not more than six months in any one year and not exceeding in amount two thirds of the patient's average earnings.
- c. A maternity benefit for working mothers, including professional care and a cash benefit for a period not exceeding eight weeks.
- d. A funeral benefit of not more than \$50.

The fund for such a system of insurance to be made up of contributions from workers, from employers and from the state. The Industrial Relations Commission recommends that the worker-beneficiary group contribute 50 per cent., the employer group 40 per cent., and the government 10 per cent. It is anticipated that the government's contribution shall be approximately such portion as is required to cover expenses of administration.

The advantage of a Federal health insurance arrangement has been strongly urged by many of those most enthusiastic. Whether or not the constitutionality of a Federal measure of this sort would be altogether free from doubt, is a question which does not appear to have received much public attention.

The obvious analogy for this sort of thing is, naturally, workmen's compensation legislation and many of the objections which are advanced against health insurance, especially those which refer to administration, can be answered by reference to the experience which some of our states have had with that institution.

An intelligent and adequate presentation of the economic loss due to sickness, a loss which falls upon the employer as well as upon the employee, will be the most powerful argument for health insurance. The immediate loss to the individual presents itself to the business man primarily as a humanitarian argument which he will at first seek to answer by reference to the existing preventive and relief agencies. A recent editorial in the *New Republic* enthusiastically endorses the plan but points out the opposition which must be overcome and the importance of making it clear that health insurance is economically worth while.

Social legislation has always had to fight its way very slowly, partly because of its neglect or inability to make clear the economic waste of permitting social wrong to continue. The business man will believe firmly enough in his workers' health when he is convinced that it is identical with the interest of his business.

Health insurance is in force in a number of countries and it works. Organized social work and organized public health are back of it here. If they can induce organized business to join with them, our ability to make it work in America is undoubted.

WHAT THE CAMPAIGN AGAINST VENEREAL DISEASE DEMANDS OF HOSPITALS AND DISPENSARIES.

MICHAEL M. DAVIS, JR., PH. D.,
Director of the Boston Dispensary.

Read before the Sociological Section, American Public Health Association, Rochester, N. Y., September 9, 1915.

Doctor Davis presents here the relation between the dispensary clinic and hospital to our so-called medical-social problems. He does away with the conception that these clinics are "charities" and describes the work as a necessary public health service.

"FIFTEEN years ago," said Professor Irving Fisher, in an address last spring before a public health meeting, "sleeping out-of-doors branded the sleeper as a crank. Today, architects and builders find sleeping porches profitable and almost necessary adjuncts of new houses, so general is the demand for them. Public opinion on the subject of fresh air, and especially of night air, has been revolutionized. I might say that, on this matter of fresh air, we have turned upside down within little more than a decade. Yet, do you know why we are not now standing on our heads?" The audience in the city of the most cultivated traditions remained silent. "Why? Because we used to be wrong side up."

We have been wrong side up in our attitude toward venereal disease also; but we are turning over now, though not quite so fast. When the Boston Dispensary was established, just before the close of the eighteenth century, a regular rule excluded from treatment all applicants who were suffering from alcoholism or venereal disease, "inasmuch as charity should not be extended to persons who are the victims of their

own sensual indulgence." It was not until about 1835 that this rule was abolished. A few weeks ago a man connected as trustee with several welfare organizations asked me what kind of cases we treated at the Boston Dispensary, and when I told him "practically all diseases," he lowered his voice and asked, "Do you treat syphilis?" "Yes, towards a thousand cases a year." "I was not quite sure," he replied, "whether you medical people felt that charitable funds ought to be used to help persons who were as wicked as that."

Whatever the campaign against venereal disease may demand of hospitals and dispensaries, it is sure to find those demands hampered chiefly by the people who see in venereal disease merely a so-called moral problem and by those other people who see nothing in it at all except something which they refuse to talk or think about. Whatever practical work we may ask of hospitals and dispensaries in helping to combat venereal disease, our broad, fundamental demand must be that they regard the matter not as a moral problem, nor as a problem to be hidden under a

blanket; but as a problem of public health, a medical problem in which social as well as scientific factors play a large part. The first demand which the campaign against venereal disease makes upon the hospital and the dispensary is that these institutions take the public health point of view, and stand ready not only to coöperate with public health officials in a passive way, but to accept the part of the public health job that properly falls to themselves and to do their part therein actively.

The hospital and the dispensary exist primarily for the treatment of disease. Are there enough hospital beds for syphilis and gonorrhea in our various communities? Are there enough and good enough outpatient clinics for these diseases? Before we can answer these questions, we must first consider other existing resources for the treatment of syphilis and gonorrhea and the relation that hospital beds and dispensary clinics should bear to these other agencies. Quality of existing facilities for diagnosis and treatment must be considered as well as quantity. These facilities, which are four, can be concretely illustrated by describing what 200 patients at the male evening genito-urinary clinic of the Boston Dispensary recently told us in response to the question, "What previous medical treatment have you had for the infection which brings you to our clinic?" These were all patients with gonorrhea. Thirty-two had had no previous treatment, these being mostly men who had come to us very soon after the onset of symptoms; 39 had been to

private physicians. Most of these had left their physician because they had no more money; some because they declared the treatment to have been unsatisfactory. Twenty-four had visited other dispensaries or hospitals. Thirty-eight had been treated by quacks or advertising institutes. Sixty-seven had treated themselves with medicines purchased on the advice of drug clerks or friends. Thus, 105, or more than 50 per cent, had had no reputable medical attention. It cannot be inferred that the proportions of persons who secured these different forms of treatment would be the same if we took a series of ten thousand patients instead of two hundred. The figures do not pretend to be representative, but they are suggestive. They specify the four existing treatment facilities for syphilis and gonorrhea, namely: (1) private medical practice; (2) hospitals and dispensaries, chiefly the latter; (3) quacks, or so-called "medical institutes"; and (4) finally, treatment by patients themselves or by drug clerks. We may call this last self-treatment.

Quack treatment and self-treatment are undesirable facilities. They should be limited, and, if possible, abolished. We can diminish the amount of quack treatment considerably by prosecuting individuals and by preventing quack advertising; but while we are diminishing the amount of treatment by quacks, we must open up more of the desirable facilities for treatment and make them accessible to more people. Otherwise shutting down on the quacks will merely increase the already vast amount of self-treatment.

There remain as desirable facilities private medical practice and what we may call institutional practice—*i. e.*, hospital wards and dispensary clinics. Since there can be no doubt that the large existing amount of self-treatment and quack treatment show that the desirable facilities for caring for syphilis and gonorrhea are inadequate, we must ask the question as to whether private medical practice can be sufficiently developed to meet the needs of the mass of the population, now having these diseases and not properly cared for. The simplest answer to this question is that, despite every financial inducement, private medical practice has not and evidently will not so develop. Reasons for this I discussed in some detail in a paper presented before one of the recent sessions of the American Medical Association in San Francisco. The outstanding reason is the high cost of private practice when of good standard.

The treatment of syphilis and gonorrhea is at the best expensive, and the development of modern medical science has rendered it more so. Efficiency of diagnosis and treatment has been increased, but more resources in equipment and laboratories and more professional skill are now required. Medical science now has power to make accurate diagnosis and to provide treatment which, if pursued, will usually lead to cure, particularly if the diseases are taken in their earlier stages. But medical science has not been able to apply its power on a large scale, because the cost of its effective application, through the medium of private medical practice, is above the

means of the majority of the population. Where private medical practice is adequate in quantity and quality for wage-earners suffering from syphilis or gonorrhea, it is usually too expensive; and when it is not too expensive it is likely to be inadequate.

For the mass of the population, not merely the "poor" but the self-supporting working and "middle" class, adequate facilities for treatment of venereal disease must be provided through organized medical resources. This means hospitals and dispensaries. This conclusion is not novel. It appears frequently in the bulky Report of the British Royal Commission on Venereal Disease. Increase of hospital beds and of dispensary clinics is a necessary and immediate step in the campaign against venereal disease. Public health officials, as leaders in the campaign, should demand more hospital and dispensary facilities, more accessible facilities, more efficient facilities, for diagnosing and treating syphilis and gonorrhea.

In the remainder of this paper I shall try to define what I mean by accessibility and efficiency in this connection.

I. HOSPITAL BEDS.

More beds for syphilis and gonorrhea are a present need in most communities. Such beds may better be in general hospitals than constitute a special venereal hospital by themselves. In many places, today, the local hospitals will not knowingly accept non-operative venereal cases. A survey of the number of hospital beds available in any locality for these

diseases is not difficult to make. The number of beds *needed* is a different matter. Cases of late syphilis and of complications of gonorrhea, enter hospitals under a great variety of diagnoses. Excluding these, and confining our attention to ward beds for early and infectious stages of these diseases, it must be borne in mind that the number requiring hospital isolation depends more on social conditions than on medical. The bulk of treatment for syphilis and gonorrhea in earlier stages can and should be ambulatory. Hospitals for cases whose home conditions render a period of isolation desirable, —for instance a case which, through a few doses of salvarsan, can be rendered innocuous to family and neighbors—are an urgent necessity. These considerations must be kept in mind with the constant endeavor to minimize, for reasons of economy, the number of hospital beds required, and to favor controlled ambulatory treatment, that is dispensary treatment. This is not said to underrate the importance of hospital beds for syphilis and gonorrhea, but to point out that a system of efficient dispensary clinics is a prerequisite to the proper and economical utilization of these beds. Most of the rest of this paper is devoted to the dispensary side, because, until very recently, almost no attention was paid to this highly important phase of the subject.

II. DISPENSARIES.

Dispensary clinics are the chief means by which adequate facilities for treating syphilis and gonorrhea are to be provided for the mass of our popu-

lation. Some cities have a number of such clinics; many have none. Many such clinics have been started in connection with teaching institutions, to provide "clinical material." A great number have been established as charities, usually as parts of general out-patient departments or dispensaries. A few recently have been started as public health measures. The point of view of the medical teacher and the point of view of the benevolent giver both have their due place in connection with such clinics, but the public health point of view should be the controlling one. The test questions to be applied to such clinics are not "How many people are they treating?" but "How many are they treating *well*?"—Not "How much good is the clinic doing?" but "How efficient can its work be demonstrated to be?"

In a paper presented before the American Medical Association in 1912, I suggested methods by which the efficiency or inefficiency of the work of such clinics could be roughly tested.¹ Since then efficiency tests have been conducted at a number of institutions, notably Lakeside Hospital, Cleveland; Cornell University Dispensary, New York City, and the Boston Dispensary, Boston. Two years ago, a section of the Associated Out-Patient Clinics of New York City formulated requirements with which it was felt all clinics treating genito-urinary diseases or syphilis should conform. These requirements are of much importance. They are, however, entirely standards of equipment and certain other details,

¹Journal of the American Medical Association, Nov. 9, 1912, page 1689.

such as forms of record. As was shown by a recent survey of the conditions of the venereal clinics in New York City (published in *Social Hygiene* for June, 1915), even these minimum standards of equipment are not met by many of the clinics in Mahattan.

Yet the standards of the Associated Out-Patient Clinics do not go far enough. We need standards of working methods as well as of equipment, and if we are to have an effective program for really efficient dispensary clinics, we must include one phase just as much as the other in our program, and just as soon. Then let us realize them all as rapidly as we reasonably can. After all, the goal is the important thing.

The Committee on Dispensary Work of the American Hospital Association, in a special report on this subject, presented at San Francisco this year, outlined briefly the working principles and methods with which efficient dispensary clinics, treating syphilis and gonorrhea, should conform. Omitting technical details, the standards of efficient dispensary clinics include the obvious requirements: (1) a medical staff sufficient in number and in special training; (2) enough well-arranged rooms, (3) equipment of instruments and apparatus; (4) laboratory service, (5) clerical and, in some cases, nursing service; (6) a card record system; also, some requirements less obvious but equally to be included, namely (7) a follow-up system; (8) social service; (9) accessibility to the persons whom such clinics ought to reach. The last three will admit of some explanation.

A Follow-up System.—This is essentially a date index of patients, dated according to the clinic day or week in which the patient is desired to return for treatment. Failure to return within the appointed period is automatically called to attention. Securing the patient's return is undertaken partly by letters, partly by social service, and especially by devoting more personal attention to him at his first and second visits. Inexpensive devices for the mechanical side of follow-up systems are extant, and such systems are now successfully maintained in a number of dispensaries. Their direct effect in promoting more continuous treatment of patients is of great value; of equal if not greater benefit is their indirect effect in stimulating the physicians and executives of the clinic to the critical study of their results and of modes of improvement.

Social Service.—Syphilis and gonorrhea are medical-social problems. Trained medical-social workers under a physician's direction are essential factors in the successful care of a considerable proportion of cases of venereal disease among both men and women. Note the following contrast. In the skin clinic at the Boston Dispensary an efficiency test was made recently for a period of six months. During this period there was no social worker in the clinic. The test showed that 27 per cent. of the syphilitic patients paid only one visit, 15 per cent. only two visits, 12 per cent. only three visits. While a certain proportion of these patients were transferred elsewhere and therefore do not count

against the clinic, it may fairly be said that in at least 50 per cent. of the cases the clinic accomplished little or nothing. The last report of the work of the syphilis clinic at the Massachusetts General Hospital to which the staff and the system were carried over from the Boston Dispensary in 1914, shows that 90 per cent. of the patients were kept under treatment and the reasons why the clinic failed to keep control of the remaining 10 per cent. were known in most cases. The comparison between the clinic without a social worker and the clinic with such coöperation is simply overwhelming.

In the autumn of 1913 the Boston Dispensary undertook a coöperative experiment with the Massachusetts Society for Sex Education. This experiment consisted in the joint engagement of a medical-social worker to serve in the Gynæcological Department of the Boston Dispensary, for the double purpose of helping patients and of studying the problems of the clinic. One of the largest of these problems is gonorrhea among women and (to a less extent) among children. Here again a transformation has been wrought. Through the establishment of a definite follow-up system, initiated by the medical-social worker in coöperation with the medical staff, and supervised by the medical-social worker, it is actually possible to get and keep control of most cases, even during the long period of treatment required by this obstinate disease. The percentage of "lost cases" drops from a large majority to a small minority of the total.

In conjunction with such work lie a

host of vivid problems: the prostitute, although such are rather infrequent visitors to most clinics; the unmarried pregnant girl, a fairly frequent visitor; the school-girl who has received an innocent infection of gonorrhea; the married women whose husbands and children should be brought to the doctor for examination. Coöperation with social agencies of all kinds is another function which such a social worker serves; to stand between the doctor and the outside social worker, interpreting the medical side to the social and vice versa. Finally, such a social worker in the clinic has the unusual opportunity of dealing at first hand with the problem of sex education, to test out literature by actually "trying it on" with patients. The method and results of this work have been described elsewhere in print.¹

Clinics for gonorrhea among men present us at once with the problem of great numbers. At the Boston Dispensary, for instance, we are treating about fifteen hundred male gonorrhea cases annually, of which about one thousand are in our morning clinic and five hundred in our evening pay clinic. Only from 12 to 18 per cent. of these patients are married men. The great bulk are unmarried, mostly men under 30 years of age; a large part under 25. With these young men there is usually no family problem which we can reach, and the young man himself can rarely be gotten at except while he is in the clinic. The vital point usually is to make him un-

¹ Boston Dispensary, 118th Annual Report, pages 39-43.

derstand the gravity of his disease, the extent and probable minimum duration of treatment, and the living conditions necessary to a cure. Thus to teach the patient is primarily the doctor's responsibility, though the social worker may coöperate with the doctor in certain selected cases. Pretty much all the work with the young men must be done while they are in the clinic.

The other great problem in a male genito-urinary clinic is the married men. In the gynæcological clinic to which I have referred, and in similar clinics at several other institutions, the social worker endeavors to bring in the husbands of the married women for examination and for treatment if they are infected. But for every woman gonorrhea patient in a dispensary we usually have four to ten men. To induce these hundreds of married men to have their wives and children secure medical examination, and, if necessary, treatment also, is a problem of social case-work, a difficult problem indeed, but one that must be attacked. In many cases the effort has been successful.

Accessibility of Dispensary Clinics.—Clinics during morning or early afternoon hours may do useful charitable service for selected sections of the population; but clinics held after the usual working hours are a necessity if the great mass of people are to find them available. The great extension of out-patient service for venereal disease must be in evening clinics. The need of evening clinics is many times voiced in the testimony before the

British Royal Commission. It should be obvious to any public health officer.

Most dispensary clinics have been established as "charities." As soon as we take the public health point of view we reach a different conception. Free clinics, or clinics charging merely nominal fees (whether held day or evening), are useful and necessary for those who are below the poverty line or who earn only very small or very irregular wages. These social groups, however, are not so large as those whose members can pay something, but not enough to provide for good medical care on a private basis. Pay clinics as well as free clinics are needed. Self-supporting pay clinics, besides reaching sections of the population otherwise neglected, will help to educate the lay public to regard this work as a public health service rather than as charity.

The Boston Dispensary, I believe, started the first evening pay clinics for syphilis and gonorrhea, and has maintained them on a self-supporting basis, charging fifty cents a visit. The Brooklyn Hospital recently opened a pay genito-urinary and syphilis clinic, held between 5.00 and 6.30 p. m. An essential condition of the pay clinic should be that the medical staff be salaried. Any other policy is clearly unjust.

The desirability of pay clinics is enhanced by the fact that a very large amount of money will be required for developing an adequate clinical service for syphilis and gonorrhea. Private charity cannot possibly cope with the situation, and public funds will be appropriated only slowly. It is therefore especially desirable that private institutions, medical, charitable, or

civic, be encouraged to start pay clinics, which will naturally be held either in the evenings or late afternoons, and which will be wholly or largely self-supporting.

How far will the medical profession of a community be likely to oppose local steps in these directions? This is one of the first questions which will come to the mind of a health officer. The payment of salaries for medical service in clinics is expedient as well as just, because it helps to emphasize the view that the clinics are public health measures, aimed against prevalent contagious diseases. If we may judge by the inspiring history of the anti-tuberculosis campaign, the medical profession through its leaders and its leading organizations, will come to support any measures which are in the interest of public health, once this all-essential point has been definitely made clear. So to make it is a task for which the health officer and the social worker have especial opportunity.

SUMMARY.

The working program presented in this paper includes the following points:

1. The present inadequate facilities for the diagnosis and treatment of syphilis and gonorrhea can be remedied only by an extension of organized medical resources, *i. e.*, by hospital beds and dispensary clinics.

2. There must be an enlargement, usually at public expense, in the number of hospital beds for syphilis and gonorrhea. Such enlargements should be made, however, after local study which leads to a definite policy as to the class of cases which are to be hospi-

talized, and the exact working relations between the hospital wards and the supervised ambulatory care provided by the out-patient departments.

3. Existing dispensary clinics should be brought to conform with already formulated standards of equipment and management; and their service should be periodically criticized by recognized efficiency tests.

4. Health departments or health officers should be responsible for promulgating clinical standards and for educating public opinion to insist that they be maintained in practice.

5. In a few large cities, the existing venereal-disease clinics would perhaps provide for the needs, at least in certain districts, if these clinics were organized so as to be efficient. But even in such localities a large extension in the form of evening clinics is necessary.

6. In most communities, the number of existing clinics is so small that there must be a large increase in the number of clinics, day and evening, pay and free.

7. Private organizations should be encouraged to start pay clinics on a self-supporting basis.

8. In most communities the establishment and maintenance of day and evening clinics by public funds will be ultimately necessary.

9. The provision of laboratory tests, of salvarsan and possibly of other medicines or materials, are proper forms in which public funds may assist private clinics that conform to satisfactory standards.

10. To cure and prevent syphilis

and gonorrhea as prevalent contagious diseases; to provide the necessary facilities to accomplish this purpose for the whole community: that is the point of view from which we should approach this matter. This view does not omit the moral aspects of the problem of venereal disease; it merely util-

izes the physical approach as an effective avenue toward the moral goal. To drive these views home to the public in general, and to hospital and dispensary trustees, superintendents and physicians in particular, is the fundamental responsibility of the public health officer.



COMPETENT HEALTH OFFICERS.

A COÖPERATIVE PLAN FOR OBTAINING OFFICERS HAVING A GIVEN STANDARD OF TRAINING.

It has become increasingly apparent that if there is to be uniformity in the efficiency with which the public health functions of the state, city, county, and district are to be administered, there must be some standard for the selection of the administrative officers thereof. While many of the large colleges are offering courses leading to the degree of Doctor of Public Health, the need of whole-time health officers is so great that the number of those who possess this degree is insufficient to fill all of the vacant positions. It would seem therefore that some test of the general fitness of the physicians engaging in this comparatively new field of activity, many of whom are untrained in public health work and somewhat unfamiliar with the requirements of the position of health officer, were necessary.

The United States Public Health Service has recently been acting in coöperation with the civil service commissions of certain states and cities, and has evolved a plan which seems to be destined to aid materially in solving the problem. Upon the application of a civil service commission, or other body delegated to make the selection of health officer, the questions for the examination are prepared in the Bureau of the United States Public Health Service, and forwarded to the proper authority. The exam-

ination is given and the papers, which are submitted by number only, are returned to the board at Washington. The papers are then graded and delivered to the person making the request for the examination, or, more usually, to a civil service commission. The commission then totals the grades as they are recorded and determines how many have passed the written examination. An oral examination is also given, whenever practicable, by an officer of the Public Health Service to ascertain the experience and general fitness of the applicant. As a rule, this portion of the examination counts 25 per cent. of the total. As soon as the grades of the oral examination are completed they are forwarded to the civil service commission, which can then certify the successful candidate to the appointing authority. In this way health officers will be selected by reason of their fitness as determined by a high standard. The civil service commission or the board of health has been rendered assistance, the office has been filled by a competent officer, and the person passing the examination has the satisfaction of having been certified by the government health agency. —W. C. Rucker, Assistant Surgeon-General, U. S. P. H. Service, *Public Health Reports*, March 24.

THE MUNICIPALITY AND THE VENEREAL DISEASE PROBLEM.

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Read before the Sociological Section, American Public Health Association, Rochester, N. Y.,
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"Teach the teacher to teach the parent to teach the children" is the fundamental note of this sensible diagnosis of a city's weakness.

WHATEVER a physician at fifty may know of the venereal disease problem, he is met at the outset of a discussion of it with two difficulties: if he be normal he is likely to have forgotten the appetites and desires of 25; and at any age he knows nothing whatever of woman. Therefore, in an attempt at taking stock of his city, his knowledge of the subject is bounded by the horizon of his own experiences, and acquaintance with the desires that men and women have revealed to him in the course of his professional communication with the sex who are pure, with those who have fallen, and those who, fallen, have become infected with the venereal disease. In his relation with patients he will find it difficult to believe that the whole or any larger part of the life history of the sexual appetite revealed to him in a consultation room, even in the frankest of stories, is really the whole story, or that the part of the story told to him is all true, though it may be mainly so.

Thus, any attempt to take an account of stock of the venereal disease of a city, even by the closest method at present available, is likely to lead the physician far astray; for, be it remem-

bered, we have as yet no means of taking stock of the closer habits of life—the physical and mental disorders of the citizens of any city. While the city is presumed to exist for all the citizens, in no city do we know the total number of children born nor of the survivors do we know how many have whooping-cough, measles, scarlet fever or diphtheria; or even the carriers of any of these diseases for which a specific organism has been discovered. And, if we do not know these things, then to an outside, unbiased and intelligent observer, how can we begin to know anything of those acts and desires of men and women that in the past have been so closely linked with religion, morals and health as to make the desires and acts at one time and place sacred and at another profane; the results of these acts in disease to be visited with jeers, jokes and physical punishment, and in the case of woman, to make her and her offspring outcasts.

Now, while our knowledge of the people and their venereal diseases is very limited, yet we do know something about the problem. We are as sure that most women are pure as that many men are virgin. From the biological side we are induced to believe

that the sexual appetite of men is stronger than that of women. Of the members of both sexes we may infer that those who sexually indulge themselves outside of the bonds of marriage and who acquire venereal disease there are both directing and restraining influences. Some are, of course, venerous; others are tempted by curiosity; others succumb because of a kind of ignorance, the influence of alcohol, especially in the young man, is a factor strongly tempting indulgence. Again, on the one hand there is stupidity bordering on feeble-mindedness, and on the other as a restraining influence high mentality, great breadth of character, regard for family, and for descendants-to-be. It is the experience of some physicians that men, and sometimes women, fall because of unusual sexual appetites, alcoholic or drug indulgence, and for some other reasons. And, even after a first illicit indulgence, strong men, both physically and mentally, tempted of appetite or under the influence of first or occasional alcoholic excess, have been known to weep with shame after a clandestine sexual indulgence.

But it must not be supposed, at least it is not the writer's experience, that sexual indulgence outside of marriage is as common as has been by some presumed. On the eve of marriage many men approach their medical advisors or married friends for knowledge of the marriage relation. From this and other facts there is evidence of a more tender regard for things sexual; even the common language has changed. Many of the habits of our forefathers would today be vulgar

in the extreme; their expressions if now used would border on obscenity; and all this change in the common language appears to show a desire to explain simply, though none the less clearly, some of the known things concerning the origin of life, its growth and birth in animals as well as man.

From our limited knowledge of this subject we are, therefore, to conclude that for the solution of the problem of the prevention of venereal disease there is but one recourse, and that is education. Not altogether that education which is to begin at the change of fourteen years or sixteen or older, but that education which shall begin with the earliest lisp of the little child when it begins to ask the question of the origin of its being and the uses of its external sexual organs. Here the mother must be the teacher. Teach the teacher to teach the parent to teach the children. Our mothers can be taught to teach their daughters, and our fathers must not only teach their sons, but they must act the part themselves. As for those of us in public life who are brought face to face with the problems of the city and its disease, we must so influence our citizens that one day there will be a real audit of human life for the promotion of health and the prevention of disease.

The diagnosis of the situation being difficult, its treatment is beset with difficulties. As we know very little of the problem itself, we are to assume that of the milder cases of venereal infection that occur, but a small percentage get to the well-qualified physician. Patients with venereal disease usually keep the knowledge of the

infection to themselves, if possible. Only among the more intelligent of the well-to-do are the services of a well-qualified physician secured. Even among the wage-earner and the very poor, medical or dispensary aid is not always obtained. Even when the services of an intelligent and well-equipped physician is secured, many patients only remain under treatment during the acute stages of the disease, and do not permit a sufficient length of time to elapse that subsequent contact infections may be prevented. The occasional case that goes to a physician or dispensary does not always continue treatment until recovery, and, so far as is known among private cases, no attempt is made worthy of the name to locate the source of the infection and to prevent its spread. This statement will also apply to those patients who are so unfortunate as to get either "quack" or drug-store treatments or advice from friends. Thus far, as we view the problem, the treatment of venereal disease by the municipality, considering the time in which we live, is not very different from its treatment in the old city of Toulouse 250 years ago, when the state and the university licensed the houses of prostitution and received the proceeds into their treasuries. There, when patients with venereal disease were received into the hospital, they were scourged when they went into it, castigated when they left it, and their treatment was of no benefit whatsoever. We, of course, no longer license houses of prostitution. No city with any respect for itself or its morals, even permits the existence of such a

public menace. All enlightened cities have abolished such places. But all cities have clandestine prostitution, and it is with this problem and the venereal diseases resulting therefrom that the municipality in the future will be compelled to deal. What, then, are we to do to correct these errors? As has been already said, we must have educators educated for the people and for the physician as well. The red plague or the scarlet sin is no longer to be made a subject for jokes. We have learned that its consequences are too serious to be treated in any light manner. We must have a new public attitude toward infectious diseases. And this includes all infectious diseases, venereal diseases as well. In the past we have judged people, and consigned them to punishment because of the infection of venereal disease as if the punishment in the disease itself was insufficient. Who are we that we should judge the victim of venereal disease, innocent or guilty? How do we know why a man or woman acquires a disease which in one social state is a vice, in another a woeful accident of marriage? And if we are to constitute ourselves as judges, how many among us can say "I never had an infectious disease; I never sinned," or "I was never tempted?" And if I never sinned, was it only accident or design and not self-restraint that I did not? Therefore, if we cannot condone the iniquity, let us at least treat the patient as a man or woman and not deny him treatment and abuse him with the cruelty of a beast.

It is, then, education first. And while we are providing for education

we will have to secure free information in simple form for all those interested in or infected by venereal diseases. They must know not only the dangers *to* themselves, but also those dangers *of* themselves to others. We must, too, have adequate simple reports of cases, in the beginning without name or address, but giving such facts as age, sex, social condition, source of infection. And to each infected person a pamphlet relating to the venereal disease must be given by the physician. And for these services we must pay the physician. Free consultations and advice, diagnosis and laboratory tests must be provided for by the city, so that all infected persons may know, through their physicians, the result of the diagnosis and what progress is being made in treatment. There should be a special department of infectious disease in all hospitals or dispensaries, to which all infectious diseases should go, and the stigma of venereal disease should be removed alike for the guilty as well as for the innocent. Free hospital care must also be provided for such patients just as free hospital care is provided for other infectious diseases. In the past, the general hospitals have treated cases of evident venereal diseases as though they were the plague. They have denied them admission to the wards, and they have failed to provide adequate means for the diagnosis and treatment of venereal diseases in their dispensaries. At the same time no adequate means have been taken to discover the non-evident cases of venereal disease in the wards, such as we have every reason to believe always

exist in the wards of a general hospital, thus evident cases have been refused admission while the non-evident have remained undiscovered.

The hospitals must not only change their present attitude toward venereal diseases, but if they are to be modern hospitals they must provide the very best men and the very best means for the diagnosis and treatment of patients suffering with venereal diseases, irrespective of the facts as to whether these people are innocent or guilty under the social law. Such patients are a menace to the public health, and it is folly to talk about isolating whooping-cough and scarlet fever when we permit gonorrhea and syphilis to run at large. In every case, private or public, sources of infection must be carefully traced, and, where necessary, free diagnosis and treatment furnished by the city. If the patient is unwilling to accept such treatment, arrest and confinement must follow. Visiting and follow-up work must be instituted, and frequent or occasional visits made after patients have been discharged in order that carriers of infection may be prevented.

This problem of venereal disease in the municipality is both a medical and social problem, if left unsolved, having vast possibilities for harm, not only in the transmission of infections themselves, but of the late remote consequences of these infections, such as circulatory changes and disorders of the nervous system, which may take place as a result of these infections. This problem is not to be solved until the cure and treatment of genito-urinary diseases cease to be a

matter for jest, and until the services of medical workers become both medical and social and are firmly, more intelligently and thoughtfully brought to bear upon the conquest of the problem. Then, and not until then, when the sexual appetites of men are brought under the restraint of education and

training, when the feeble-minded are segregated, when alcoholism, the drug habit and the patent medicine habit become no more, will the venereal disease problem be in process of conquest; for then, they who lust after irregular sexual pleasures will be bound to make us free.



MUMPS.

"In view of the succession of brilliant discoveries which have disclosed the etiologic agents in the production of many infectious diseases, thereby paving the way for the relief and control of the harm instigated by them, there is something tantalizing in the limitations of progress which has been experienced in other instances. The infectious diseases, indeed," says the *Journal of the American Medical Association*, "still offer abundant opportunities for investigation. The rôle of bacteria as a cause of several has long been clearly understood. The responsibility of protozoa for certain other pathologic states is now better appreciated. Some undoubted infections still defy all search as to the nature of the etiologic factor; and in the case of some of these, the fact that the virus retains its infectious property, even after being passed through a fine porcelain filter, gives ground for the hypothesis that the germs here present are too minute to be recognized in the usual way with the present powers of our microscopes. Here one must deal with the so-called filterable viruses.

"Mumps is one of the highly infectious diseases; its etiology is unknown; it is always more or less present, in cities, at least, and it is liable to be epidemic at certain seasons of the year. A number of microorganisms have been described in the past as the presumable causative agents; but every serious attempt to apply to these bacteria the criteria and demonstrations which are called for, before the relation of cause and effect in disease can be regarded as proved, has failed. In 1908 Granata concluded that the virus of mumps may be of the filterable type. However, neither he nor Nicolle and Conseil, who injected bacteria-free fluid from the parotids in cases of human parotitis and obtained in animals symptoms somewhat comparable with those of mumps, really succeeded in reproducing the disease satisfactorily. Not a little interest must center, therefore, in the newest experiments in this field by Dr. Martha Wollstein at the Rockefeller Institute for Medical

Research. She has succeeded in reproducing the chief organic lesions of parotitis in animals by means of filtered extracts of saliva derived from persons suffering from acute parotitis. Thus injections, into cats, of bacteria-free filtrates of the saliva have been capable of setting up a series of pathologic changes in the parotids and testicles, expressed by fever, leukocytosis, tenderness and swelling attended by definite histologic alterations. There is a greatly added significance in the further fact that the effect of the injection is intensified by successive transfers of the inoculated organs from animal to animal through several passages.

"It is almost needless to add, at a time when the importance of adequate control of such significant findings is obviously imperative, that the effects attributed to the saliva from patients with parotitis did not follow the injection of filtrates prepared from the saliva of healthy persons. The active agent present in the infectious saliva was found to be neutralized or in some way rendered ineffective by the serum of an animal that had survived the injection of testicular and parotid emulsions, while the serum of a normal animal had no such power. Here, then, is a phenomenon surprisingly like others that are now familiar in the experience of immunology in infectious diseases. Doctor Wollstein remarks that in all these manifestations obviously ordinary bacteria can be excluded as the active agent, since they were never found in microscopic preparations of the 'filtrate,' or in aerobic or anaerobic tissue cultures or in sections of the inoculated parotid and testes. Under these circumstances it seems reasonable to suppose that the active agent is of living nature, thus suggesting the existence here of a minute filterable virus. As a corollary to this, the power of prevention exercised by the serum may be assumed to be due to an immune substance developed in the inoculated animals. This is an approach, at least, to the determination of the specific microbic cause of parotitis or mumps in man."

THE SEWAGE PROBLEM IN SMALL TOWNS.

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Read before the Section of Public Health Officials, American Public Health Association, Rochester, N. Y.,
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The small town, large enough to need a system of sewerage but small enough so that the expense per individual installation is greater than in large cities, presents one of the acute problems of sanitary engineering. Mr. Hansen discusses some of the means employed to dispose of the wastes of small communities.

ONE of the most troublesome problems that confronts the small community is how to get rid of liquid household wastes called sewage. The advantages of plumbing throughout the household are being more and more recognized and even in communities of only a few hundred population plumbing will be found in many residences and in the school-house. All this tends to greatly increase the volume of sewage that must be disposed of. Leaching cesspools and sewage cisterns are never satisfactory—the former constitute a serious menace to wells and the latter must be emptied periodically which is expensive.

The next resort is the installation of field tile drains or the utilization of existing tile drains originally intended for removing storm water. Generally ordinances require that the coarser solid matters be removed by the householder in some form of tank; a septic tank, it is most always called, a device variously conceived in various minds, but most people are deluded into the belief that any tank called a septic tank will in some mysterious way completely purify sewage. The liquid in

the drains whether passed through tanks or not soon becomes very foul and causes trouble by backing into cellars during storms or by leaching into the ground and polluting wells. Nuisances also develop in the water-courses into which the drains have outlets and at surface water inlets. Such nuisances are frequently the cause of very bitter complaint.

The situation is apt to be further aggravated by the installation of a public water supply which greatly promotes the use of plumbing and this in turn greatly increases the volume of sewage to be disposed of. This statement should not be construed as a discouragement of the installation of public water supplies. On the contrary one cannot too highly estimate the value of a public water supply to any community of 500 population or over as a protection against fire, as a household convenience, for beautifying lawns and parks, as a means to greater cleanliness, but most of all as a great factor in the promotion of public health providing the source of supply is pure.

To return to a consideration of the increased sewage produced by a public

water supply: At this point in the progress of a community that has any civic pride whatsoever, the demand for more adequate removal and disposal of sewage becomes very insistent but the desire to solve the problem cheaply often leads into error, not only in failing to secure an adequate solution of the problem but more often in gross lack of economy when the matter is viewed broadly and in the long run. It is the object of this article to point out the most common pitfalls and to recommend a rational procedure in connection with sewerage installations.

First of all, it must be realized that the only adequate solution is a well-planned system of sewers covering the entire community. Not that the entire system need be built at once, but it should be planned before any construction is begun. A line of sewers here and a line of sewers there only leads to complications which are costly to rectify. Such a policy permitted to continue for any length of time means many sewer outlets with as many stenchcs to correspond. Treatment of the sewage to render it inoffensive at each of the numerous outlets is hopelessly impracticable and intercepting sewers for the purpose of carrying the sewage to a single outfall can only be built at great cost, relatively speaking, and the results are rarely satisfactory.

The danger of permitting even one of these promiscuously laid sewers to be installed is a very great one, for it gives to a few people sewerage facilities that are satisfactory to them but most unsatisfactory to the remainder of the community and the few who are satis-

fied become most active opponents of any project looking toward the rational solution of the sewerage problem as a whole and their opposition is liable to be decisive if the improvement must be installed by special assessment.

Most small communities are on or near very small streams often without any summer flow at all so that sewage cannot be discharged into them without creating a gross nuisance. Many times, because of remoteness from habitations or because the streams are not used for any purpose such as public water supply, manufacturing, cattle watering, boating and fishing, no complaint is made and the nuisance is permitted to continue. But with increasing size of the communities and an increasing use of the waters of the streams, sewage treatment sooner or later becomes necessary and every community, excepting those on very large streams, should so plan its sewerage system that sewage treatment may be carried out in a simple, effective and economical manner whenever circumstances require.

The system of sewers which, with very few exceptions, is best adapted to meet the necessity of purifying the sewage is the so-called separate system as distinguished from the so-called combined system. The separate system is also decidedly the more economical in small communities with reasonably good natural drainage. The important feature of this system is that it provides for the removal of domestic sewage and other putrescible wastes in one set of conduits and the relatively clean storm water run-off in

another set of conduits. The laterals in the system for removing domestic wastes may be as small as six inches in diameter while the main outfall in small communities need rarely exceed eighteen inches in diameter. With the domestic sewage properly cared for, the storm water may be discharged through short conduits of larger size and laid at comparatively shallow depths into the nearest available water course. Usually storm-water drains need not be installed until street paving is undertaken, thus making the expense a gradual one.

As to methods of final disposal: Where the flow in the stream which is to receive the sewage exceeds five cubic feet per second per 1,000 persons using the sewers, the crude sewage may be discharged directly without producing a nuisance, though some care is required in the design of the outfall to insure a good mixture of the sewage with the water of the stream.

If the minimum stream flow is below five cubic feet per second and over three cubic feet per second per 1,000 persons using the sewers, then some form of fine screening or treatment in tanks is necessary. As fine screening cannot be readily applied excepting on a rather large scale, the small community is practically confined to the use of tanks.

There are three principal forms of tanks now in use, namely, plain sedimentation tanks, septic tanks and double-deck or Emscher tanks. The first is now seldom used in small installations because it involves a troublesome sludge removal problem. Septic tanks have gained a very strong

hold on the popular mind as a means of sewage treatment and they are very widely used though often incorrectly and unintelligently. They overcome in a measure the sludge problem but are apt to be malodorous and to produce an inferior effluent. The two-story or Emscher tank is the one now most generally favored by sanitary engineers because it produces a fresh, well-settled effluent yet provides for complete retention and thorough digestion of the sludge.

Where the dilution available is less than three cubic feet per second per 1,000 population tributary to the sewers, some form of filtration, in addition to sedimentation, is necessary. The principal devices used are intermittent sand filters, contact beds and sprinkling filters. The limits of this article do not permit of giving a description of these devices or even stating the work they may each be counted upon to perform. Suffice it to say that the selection of a suitable device depends very much upon local conditions and is generally a matter for expert decision.

Many small communities flounder about badly in undertaking the installation of a sewerage system and in closing this paper a brief statement will be made as to the correct procedure.

First of all secure the services of a competent engineer especially versed in sewerage design and construction and if sewage treatment is necessary it is often desirable to employ a specialist in this line. A specialist in sewage treatment is generally necessary for preliminary investigations and the preparation of plans and specifications,

while the laying out and construction of the system may be intrusted to the city engineer if there is one.

The engineer should be first instructed to draw up preliminary plans, an approximate estimate of cost and a descriptive report, all of which should be submitted to and receive the approval of the proper state authorities. In practically all states where such control is exercised it is vested in the State Board of Health.

Upon favorable action by the state authorities, the project may be submitted to a vote of the people, generally a necessary preliminary to the issuance of bonds.

Following a favorable vote of the people, the engineer should be instructed to prepare detailed plans and

specifications as a basis for spreading assessments (for such portions as are to be built by special assessment) and as a basis for receiving bids and awarding contracts.

Before advertising for bids or entering upon the special assessment procedure, the detail plans should again be submitted to the state authorities for final endorsement.

During construction, the city should maintain constantly on the work, one or more competent engineer inspectors, and finally, when the system is completed, the authorities should make ample provision for proper upkeep and operation especially if sewage treatment works are included. Sewers and sewage treatment works will not maintain themselves.



TUBERCULOSIS DEATH-RATE DECLINES 25% IN TEN YEARS.

While the latest report of the Bureau of the Census shows that in 1914 tuberculosis caused over 10.5 per cent. of all deaths in the registration area of the United States, the National Association for the Study and Prevention of Tuberculosis points out in a statement issued today that the death-rate from this disease is steadily decreasing, having declined from 200.7 per 100,000 population in 1904 to 146.8 in 1914. This would indicate, the association claims, that the anti-tuberculosis movement organized in the last ten years is having a marked effect on the mortality of tuberculosis, especially since the death-rate from this disease seems to be declining more rapidly than the general death-rate from all causes.

Commenting on this decrease in the rate from tuberculosis, the Bureau of the Census says: "As a result of a more general understanding of the laws of health, the importance of fresh air, etc., due in part, no doubt, to the efforts of the various societies for the prevention of tuberculosis, there has been a most marked and gratifying decrease during recent years in the mortality from this scourge of civilization. In only

a decade—from 1904 to 1914—the death-rate from tuberculosis in all its forms fell from 200.7 to 146.8 per 100,000, the decline being continuous from year to year. This is a drop of more than 25 per cent."

As an indication of the growth of the campaign against tuberculosis, the National Association for the Study and Prevention of Tuberculosis shows that in 1905, when the campaign was definitely started, there were in the United States only thirty-nine anti-tuberculosis associations, 115 sanatoria and hospitals, twenty special clinics, no open air schools, and not more than 5,000 people actively interested in the prevention of this disease. At the close of the year 1915 there were over 1,500 anti-tuberculosis associations, 600 sanatoria and hospitals, 450 dispensaries, 800 open air schools, and over 100,000 people actively interested in the prevention of tuberculosis. Besides this, the fundamental truths that tuberculosis is a communicable, preventable and curable disease have been carried into almost every village and hamlet and to millions of men, women and children in a great variety of ways.

DISINFECTION AS A FACTOR IN THE CONTROL OF COMMUNICABLE DISEASES.

B. F. KNAUSE, M. D.,
New York City Health Department.

Read before a General Session of the American Public Health Association, September 10, 1915.

Dr. B. F. Knause of the New York City Health Department here discusses the various types of disinfection as tested out in New York City, and compares terminal cleansing and terminal fumigation.

THE value of disinfection as a factor in the control of communicable diseases rests upon its power to destroy the infective agents and in this way prevent the occurrence of later cases. In order to determine its worth it is necessary to consider the manner in which infection takes place, the period of greatest infectivity as judged by a study of later cases, and the ability to control the number of later cases by disinfection. The methods used are numerous and, as their relative values have been discussed at length in text-books, it is not the intent of this paper to review the same.

In the spread of communicable diseases it is necessary that a susceptible be brought in contact with the infective agent either directly as in diphtheria, or through an intermediary host, as in yellow fever. The administrative control of communicable diseases depends upon ability to maintain the two important and closely allied functions of isolation and disinfection, and the latter may be classified for purpose of study into mediary and terminal disinfection.

Mediary disinfection, that occurring during the course of the disease,

is of great value. Few will doubt that the spread of disease is prevented by the proper disinfection of sputum in open cases of tuberculosis, the stools of typhoid fever patients, or the secretions from the mouth and nose of a case of diphtheria as examples. A working classification and a description of the means to be employed is found in an excellent monograph by Dr. Hermann Biggs, Commissioner, New York State Department of Health, entitled: "The Conduct of An Isolation Period for Communicable Diseases in the Home."

The performance of mediary disinfection will, as at the present time, depend upon the attending physician to a large degree until appropriations provide sufficient field-workers to properly supervise cases of infectious disease. Under present conditions the busy practitioner presumes that the family or unskilled attendants are familiar with the details of disinfection and fails to emphasize the same, and the instructions given are of oral character and soon forgotten. In New York City circulars or hanging cards giving explicit instructions are delivered by the field-workers or in the minor diseases mailed to address of family.

That an insufficient number of field-workers is provided to supervise the observance of these instructions is shown in a recent study of scarlet fever cases in Brooklyn. Out of 1,610 cases, 1,000 of which occurred in tenement houses, only 157 were supervision cases.

Mediary disinfection may be made more formidable by education of the laity and the family physician, as well, to appreciate its value. The physician must be taught to make use of his prerogative or permit the field-worker to give instructions. A complaint to the Health Commissioner by a Brooklyn physician that a field nurse was interfering and instructing his patient showed upon investigation a lack of isolation and disinfection which would justify forced removal to hospital; and the nurse had been guilty of insisting that the instructions on the hanging card be obeyed. This physician stated that he considered himself competent to attend to his patient and did not desire to have any nurse "butting in"—yet he had ignored all precautions. Another physician objected strenuously to advice given by the field nurse that a scarlet fever patient, whose quarantine period had expired, should be given a bath and clean clothes before leaving the apartment. He objected to the bath because he feared that patient might develop a nephritic condition. These cases are cited to emphasize the peculiar position of the field nurse—subject to criticism for an attempt to obey orders and censured if the orders are not enforced. These conditions must be remedied if mediary disin-

fection is to occupy its proper place as a marked factor in the control of communicable diseases.

Terminal disinfection may be performed by cleaning, renovation or fumigation.

Cleaning and renovation are desirable from the sanitary view, and are performed by tenant or landlord without cost to the city. In cases of tuberculosis, renovation should be enforced as a preventive measure.

Fumigation in contrast to cleaning and renovation is too costly a procedure to perform without reasonable proof of its value. During the year 1913, 29,900 fumigations of 46,762 rooms requiring 83,524 units of fumigation were performed in the city of New York. The cost of material was \$14,208.20, and the salaries of disinfectors, approximately \$38,550; a total of \$52,758.20. The approximate cost of labor alone based on 3,232 fumigations in the Borough of Brooklyn is 85 cents per fumigation. The cost of material was 9½ cents per M. cubic feet. The estimate of the year 1913 is submitted because of its accuracy due to the fixed price of potassium permanganate which was obtainable at the price of 17-18½ per kilo, while in 1914-1915 it ranged from 70 cents to \$1.60 for the same amount. The method employed was as follows: For a room of 1,000 cubic feet, 1 oz. of para formaldehyde and 2¼ oz. of permanganate potash were thoroughly mixed with 3 oz. of water; all doors, windows and outlets being sealed, the room was exposed to the moist vapor for at least four hours.

As to the efficiency of this method, later comment will be made.

A comparative study to estimate the value of fumigation was made in New York City during the first five months of the present year. In the Boroughs of Manhattan, Bronx, Queens and Richmond, fumigations by the Department of Health were discontinued, while in the Borough of Brooklyn terminal fumigations were performed in all cases of scarlet fever and in those cases of diphtheria which were terminated by death or removal to hospital. A record of original as well as later cases was kept in each of the boroughs and is shown in Table 1. This table of later cases

TABLE 1.
SCARLET FEVER.

	No fumigations.				Fumigations.	
	Manhattan.	Bronx.	Queens.	Richmond.	Total.	Brooklyn.
Original cases	3,331	950	522	92	4,895	2,206
Later cases ..	263	118	78	16	475	156
Percentage ..	7.8	12.4	14.9	17.3	9.7	7.07

includes all cases occurring before and after termination of the original case. The incubation period of scarlet fever being accepted as one to five days, cases appearing within this period from the time that fumigation was or would have been performed may have been due to infection previous to termination and not preventable by fumigation. Based on this premise, Table 2 shows the subdivision of later cases into two classes:

TABLE 2.
LATER CASES.

	Manhattan.	Bronx.	Queens.	Richmond.	Total.	Brooklyn.
Class A.	229	101	76	16	422	134
Percentage.....	6.8	10.6	14.5	17.3	8.6	6.08
Class B.	34	17	2	0	53	22
Percentage	1.02	1.78	.38	.00	1.08	.99

Class A.—Those cases occurring before five days from the date when fumigation was or would have been performed.

Class B.—Cases occurring subsequent to this date.

The comparison between the Boroughs of Manhattan and Brooklyn is of greatest interest, because of more similar conditions of population and sanitation. Class A shows a difference in favor of Brooklyn of .72 per cent. which would indicate either fewer susceptibles or more perfect mediary disinfection.

Class B, which is the essential part in the estimation of the value of terminal fumigation, shows a difference of .03 per cent. in favor of Brooklyn with fumigation, over the Borough of Manhattan without fumigation. Taking the average of all the boroughs in which there was no fumigation and comparing it to Brooklyn where fumigation was performed, there is a difference of .09 per cent. in favor of Brooklyn. Based upon this percentage, out of 4,895 cases, it might have been possible to prevent four of the later cases if fumigation had been performed throughout the city, provided of course that the efficacy of

fumigation was in itself responsible for the difference in percentage. Statistics of this kind vary, as shown in a previous count of scarlet fever cases in Brooklyn. One thousand six hundred and ten cases in the year 1914 showed only 70 later cases as compared to 156 later cases in the 2,206 cases in 1915, the total number of later cases being 226 out of 3,816 cases.

The onset of these later cases bears upon the relative value of mediary and terminal disinfection as evidenced by the fact that 194 cases or 85.8 occurred before the quarantine period of 30 days had expired. Taking a date five days from termination of the original case, the statistics of 1915 show that out of 631 later cases in all boroughs, 536, or 88 per cent., were subject to mediary, and 75, or 12 per cent., subject to terminal disinfection. The responsibility of the Department of Health for the control of any case of infectious disease dates from the receipt of the original report from the attending physician. Supervision begins at the time first visit is made and premises are placarded. A large proportion of the later cases appearing within the incubation period from the date of placarding are not subject to control by any administrative procedure. These cases should not be included in the mediary class and it is of interest to ascertain their ratio. A study of 200 later cases occurring in Brooklyn Borough shows that 104 cases or 52 per cent. occurred within 5 days from the date of placarding. This percentage is very high and it is doubtful if it would be borne out by a study of a larger number of cases. A table showing approximately the

relative values of later cases subject to disinfection would be as follows:

	Per cent.
Not subject to disinfection	40
Subject to mediary disinfection . . .	45
Subject to terminal disinfection . . .	15

During the year 1913 terminal fumigation was enforced in all cases of measles occurring in the Borough of Brooklyn and the number of reported cases was 9,425 as compared to 8,346 reported cases in 1914 with no terminal fumigation. The value of disinfection in preventing the spread of measles is questionable. The studies of Anderson and Goldberger show that the infection in this disease is essentially a contact infection due to minute droplets and that the infectivity is marked in the pre-ruptive stage before the diagnosis has been established and while children are at school. Many cases are unreported and return to school before the cessation of the catarrhal symptoms and isolation at home in a large proportion of cases is imperfect so that sources of infection are constantly present and the number of cases dependent really upon the number of susceptibles.

Attention is called to the chart showing the number of cases in Brooklyn for the past ten years which bears evidence to this fact.

In certain of the communicable diseases where the infective agent and method of transmission are known, terminal disinfection is an admission that either mediary disinfection has been inefficient or that the case has not been terminated by scientific procedure; for example, in diphtheria, if Klebs Loeffler bacilli are present

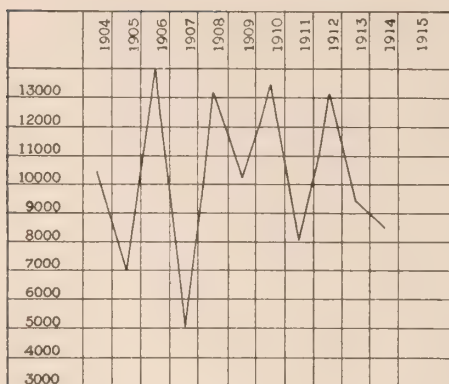


Chart showing yearly incidence of Measles in Borough of Brooklyn.

in the throat, the case should not be terminated and any disinfection would result in a false sense of security and the spreading of infection. If repeated negative cultures show no bacilli are present, it seems reasonable to expect that those which have escaped the process of mediary disinfection have become so attenuated by sunlight, diffuse light or lack of proper supporting media as to be no longer pathogenic. The lack of terminal bacteriological examination of the stools in typhoid fever is another evidence of improper termination.

In the control of smallpox, mediary and terminal disinfection are factors but they would be of slight importance if the community were properly vaccinated. The immunizing of persons exposed to diphtheria and typhoid fever, the destruction of vermin in typhus fever, of rats in bubonic plague, all tend to minimize the value of disinfection in these diseases.

The ability of formaldehyde fumigation as performed in the city of New York to destroy bacteria is very

doubtful or negative. This is not of sufficient importance to justify discussion inasmuch as proper isolation, careful mediary disinfection, scientific termination, followed by cleaning or renovation, would so reduce or eliminate the number of cases now subject to terminal fumigation that the efficiency of any method of fumigation would be of little moment.

It is difficult to estimate the psychological value to the public of fumigation, but superstition should yield the right of way to scientific knowledge. The marked interest and criticism which mark any change in a belief in any long established procedure should offer vast opportunities for educational purposes through the medium of the daily press.

To summarize:

(1) There is a certain proportion of cases over which there is no administrative control.

(2) Mediary disinfection is a most important factor, neglected both by the attending physician and Department of Health, entitled to much greater attention and strict supervision.

(3) Terminal disinfection by cleaning and renovation are desirable from a psychological and sanitary view, and in certain diseases, like tuberculosis, renovation should be strictly enforced.

(4) Terminal fumigation is a costly procedure, the method and reliability have no weight, as the necessity for a procedure of this kind is an admission of improper isolation, imperfect mediary disinfection or improper termination. As a factor in the control of communicable diseases it is of negative value.

COMMISSION SUPERVISION OF INDUSTRIAL HYGIENE.

WALLACE D. YAPLE,
Chairman, The Industrial Commission of Ohio.

Read before the Industrial Hygiene Section, American Public Health Association, Rochester, N. Y.,
September 10, 1915.

Ohio has taken a leading place in the sanitary and hygienic phases of industrial life. The Industrial Commission and the State Board of Health are in coöperation in their efforts along this line.

THE subject of industrial hygiene is one that is now receiving the earnest attention and consideration, not only of medical men and experts but of those most directly and vitally concerned, viz., the employers and employees of the country.

It has not been many years since employers, as a class, were utterly unable to appreciate the economic value of hygienic working conditions of their employees, and the employees themselves were loth to coöperate with their employers in such isolated instances as attempts were made by them to promulgate and enforce rules and regulations having for their object the creation of hygienic working conditions.

The enactment of workmen's compensation laws, which place upon the employer the burden of compensating employees sustaining injury in the course of their employment, in practically all of the industrial states of the union has been the means, more than any other one thing, of awakening in the minds of employers the importance of industrial safety and hygiene, and it is becoming to be generally recognized that, viewed solely from an

economic standpoint, it means a saving in dollars to have working conditions approach as nearly as possible the ideal.

The importance of industrial hygiene being conceded, the important question is as to the methods to be adopted in securing it. For reasons which are manifest the subject is one which cannot be left to the judgment and discretion of individuals, and therefore, the police power of the state should be invoked to secure general and uniform observance of what are ascertained to be hygienically correct principles.

Should this be done by the enactment of specific laws by the legislative authorities of the several states whereby the duty of complying with certain definite and specific requirements of the law is imposed upon the employer? Or, should the legislative authority simply lay down the broad and unqualified rule that all employments and places of employment shall be safe and sanitary and delegate to some agency of government the duty of ascertaining what conditions and appliances are safe and sanitary, and executing and enforcing the law accordingly?

Aside from a question of constitu-

tional law which is involved, the problem is a practical one, and is merely that of the most effective method of attaining the desired results. Under our system of state government the powers of the state are delegated powers. No inherent powers are possessed by it and the powers exercised by the executive, legislative and judicial branches of the government must be exercised each in its proper sphere. The powers of one branch must not encroach upon those of any of the others, and the powers of one cannot be delegated to those chosen to perform the others. While the principle is elementary that legislative power must be exercised by the legislative branch of the government only, and cannot be delegated to any of the other branches, in practice it is often a matter of great difficulty to determine whether the doing of a particular thing is an exercise of legislative or executive power. But it seems to be well settled that there is no objection to the delegation of legislative functions which are administrative or executive in character, to departments of government created by the legislative power, and that there is a wide difference between a delegation of the power to *make the law* and a grant of authority relative to its *execution*. It follows that, where the legislative body has established a general rule of law, it is competent for it to create a board or commission or other agency clothed with power and authority to adopt rules and regulations by means of which the law itself is made effective. The granting by the law-making power to city councils and

boards of health of the right to make local ordinances and orders respecting the public health and well-being, and the granting to boards and commissions the right to determine and establish fair and equitable rates to be charged by railroads and other public service corporations, are illustrative of the apparent exceptions to the principle of non-delegation of legislative powers.

Prior to the year 1913 the method in vogue in Ohio was that of specific legislation. In 1913, following the example set by Wisconsin, the General Assembly of Ohio passed an act creating The Industrial Commission of Ohio, the commission thus created being not only charged with the duty of administering and enforcing the general laws of the state for the protection of the life, health, safety and welfare of employees and places of employment (all of which were left in full force and effect), but also being clothed with the power and authority to ascertain and fix such reasonable standards, and to provide, modify and enforce such reasonable orders for adoption of safety devices, safeguards and other means and methods of protection, to be as nearly uniform as possible, as may be necessary to carry out all laws and lawful orders relative to the protection of the life, health, safety and welfare of employees and places of employment. That the commission may fully exercise its functions, it is given jurisdiction over all employments and places of employment within the state. So, as matters now stand, Ohio has such specific statutory provisions relative to in-

dustrial hygiene, as were in force prior to the passage of the industrial commission act, supplemented by the general requirements and broad powers of supervision and enforcement contained in that act.

The act provides, in substance, that every employer shall furnish employment which shall be safe for the employees therein, and shall furnish a place of employment which shall be safe for the employees therein, and shall furnish and use safety devices and safeguards and shall adopt and use methods and processes and follow orders, and shall prescribe hours of labor reasonably adequate to render such employment and places of employment safe, and shall do every other thing reasonably necessary to protect the life, health, safety and welfare of such employees. The words "safe" and "safety," as applied to any employment or place of employment, are defined to be "such freedom from danger to the life, health, safety or welfare of employees . . . as the nature of the employment will reasonably permit, including requirements as to the hours of labor with relation to the health and welfare of employees."

One of the duties especially enjoined upon the commission is to investigate, ascertain, inquire and prescribe what hours of labor, safety devices, safeguards, or methods of protection are best adapted to render the employees of every employment and place of employment, and frequenters of every place of employment, safe, and to establish and maintain museums of safety and hygiene,

to ascertain and fix such reasonable standards and to prescribe, modify and enforce such reasonable orders for the adoption of safety devices and safeguards and other means or methods of protection as may be necessary to carry out all laws and lawful orders relative to the protection of the life, health, safety and welfare of employees.

The commission is granted plenary power with reference of making investigations for the purpose of ascertaining facts, and employers are required to furnish it with all information required by it to carry into effect the various duties imposed upon it, and any member of the commission or any of its duly authorized deputies may enter any place of employment for the purpose of collecting facts and statistics relative to the health, safety and welfare of employees therein, and for the purpose of ascertaining any failure on the part of the employer to comply with the laws of the state or the orders of the commission with reference to the preservation of the health and safety of employees.

Thus it will be seen that the General Assembly has laid down a broad, general requirement that all employments and places of employment must be safe and sanitary, with the qualification that nothing unreasonable shall be required. In other words, the requirement is that all employments and places of employment shall be as free from danger to the health and safety of the employees *as the nature of the employment will reasonably permit*.

When the commission has ascer-

tained what should be the standards of safety and hygiene, it is its duty to formulate "orders" embodying its requirements. Such orders are "general" and "special." A "general" order is one that applies generally throughout the state, to all persons, employments or places of employment of a class under the jurisdiction of the commission. A "special" order is one which applies to a particular individual or particular place of employment, and is designed to secure the observance either of a statute or of a general order theretofore duly made and promulgated by the commission. All general orders must be published, but it is sufficient to print them in pamphlet form for distribution to those who apply for them.

The commission is authorized and empowered to appoint advisors, who shall, without compensation, assist in the execution of its duties, and this provision is of very practical importance, as it enables the commission to call to its assistance men possessing ripe experience and judgment and special knowledge on the subjects of industrial safety and hygiene. In selecting such committees for the purpose of making investigations and formulating orders on the subject of industrial safety and hygiene, the commission has had no difficulty in procuring the services of the most prominent men in the state from the ranks of both employers and employees. Inasmuch as all specific laws on the subject of industrial safety and hygiene were left in full force when the industrial commission act was passed, the commission has not acted

hastily in exercising its broad powers, but has proceeded deliberately and cautiously. A number of advisory committees have been at work for more than a year and all will report, at an early date, the result of their investigations, along with their recommendations as to what general orders should be adopted and promulgated by the commission. No doubt the commission will adopt the recommendations made with little, if any change.

One of the most important advisory committees designated by the Industrial Commission to assist it in formulating hygienic orders is one consisting of the executive officer and the members of the division of occupational diseases of the State Board of Health. At the same session of the General Assembly at which the industrial commission act was passed, the State Board of Health was authorized to make an investigation of the "effect of occupations upon the health of those engaged therein with special reference to dust and dangerous chemicals and gases, to insufficient ventilation and lighting, and to such other unhygienic conditions as in the opinion of said board may be specially injurious to health." The investigation so authorized was conducted, and a report thereof made under the direction of Dr. E. F. McCampbell, Executive Officer and Dr. Emery R. Hayhurst, Director, Division of Occupational Diseases of the State Board of Health, and, without doubt, it is the most thorough and complete of any similar effort yet made in this country. The purpose of this investigation was to

secure accurate information as to industrial diseases and their causes, in order that measures might be adopted preventing them, as far as possible, and that provision might be made for compensating their victims. By availing itself of the services of those who made this most valuable investigation and report, the Industrial Commission hopes to be able to formulate such reasonable and necessary general orders on the subject of industrial hygiene, as will result in much benefit to the individuals engaged in the occupations in which they occur, and to the general public.

The Industrial Commission of Ohio has not made sufficient progress to warrant the unqualified statement that questions of industrial safety and hygiene should be left solely to the judgment and discretion of the commission, but enough has been accomplished to justify the belief that the plan now being followed will, in time, eliminate most of the well recognized health hazards from industry. One of the most hopeful signs is the spirit of coöperation between employers, employees, and the state authorities that has resulted from the appointment of "advisory committees." These committees are composed of leading employers, employees and physicians of the state. When their recommendations are adopted by the commission and become "general orders" it is obvious that much of the difficulty of securing law observance on the part of employers will have disappeared, for employers have themselves suggested the standards to be observed after first having determined their reasonableness.

Under the old plan of specific legislation only, with no officer or commission specifically designated to enforce the laws, law enforcement was left largely to local authorities, and the result was that nowhere was there strict enforcement, and the rule was lax enforcement or non-enforcement. Under the new plan, with well recognized standards of safety and hygiene embodied in specific statutes, supplemented by the general requirement that all places of employment shall be as safe and sanitary as the nature of the employment will reasonably permit, with authority vested in the Industrial Commission to ascertain correct standards and adopt and promulgate general orders for the observance of those engaged in the various industrial pursuits, the state, through its commission says, in effect, to employers and employees: "The state is desirous of eliminating health hazards from industry. You are the persons primarily affected by such hazards. Let us counsel together and determine what reasonable standards and requirements should be established to protect the health and lives of the more than a million men and women engaged in gainful occupations. When such standards and requirements have been ascertained, let us coöperate to secure general observance thereof, invoking the police power of the state only when necessary." By following this plan it is my opinion that more will be accomplished in a few years than could be accomplished in a decade through the instrumentality of volumes of penal statutes and an army of factory inspectors.

COLON BACTERIA AND STREPTOCOCCI AND THEIR SIGNIFICANCE IN MILK.

L. A. ROGERS, WILLIAM MANSFIELD CLARK and ALICE C. EVANS,
Dairy Division, Bureau of Animal Industry, U. S. Department of Agriculture.

STATEMENTS relating to the significance of the presence of a particular organism in milk or water are usually based on the assumption of a restricted normal habitat for the organism in question. The presence in milk of streptococci with certain characteristics is more or less conclusive evidence that the milk came from cows with infected udders. Since the habitat of the colon bacillus is the animal digestive canal, the presence of this organism in milk or water is proof of the contamination of the milk or water by fecal matter.

It is perfectly proper to ask if we have a sufficiently intimate knowledge of these two groups of bacteria to permit any positive statement as to the limits of their habitat. We may even question whether our methods of classification have been sufficiently comprehensive and, above all, sufficiently exact and accurate to enable us to distinguish between different members of what are evidently heterogeneous families. The limitation of the colon bacillus to the intestine has been questioned by the work of Prescott on the occurrence of colon on grains and by Johnston who found a bacillus which could not be distinguished from colon growing in decaying buds of the palm.

Before a categorical statement can be made to the effect that the presence in milk or water of bacteria of a certain rather indefinitely defined type is

more than presumptive evidence of fecal contamination we should have more detailed information not only of the bacteriology of the regions whence these bacteria come, but also of other regions whence they may come. This information can be obtained only when we have more intimate acquaintance with the various individuals making up the streptococcus and colon families.

Some of this knowledge has accumulated in the past few years. The objection will no doubt be made that the recent differentiations, particularly of the streptococci, have been based on physiological functions such as the fermentation of carbohydrates and that these characters are variable and undistinctive. The limits of this paper will not permit a discussion of this phase of the question but it may be said that the fermentative reactions are at least as constant and distinctive as the characters usually employed and that they become less variable as our methods of determination become more nearly exact. Moreover, by the intelligent use of these reactions, we obtain results which promise to bring order out of confusion.

In many laboratories the presence in milk of streptococci forming chains in lactose broth at 37° is taken as evidence that at least part of the milk came from infected udders, and sometimes as conclusive evidence of contamination with cow feces. Is the property of forming chains under these

conditions peculiar to the bacteria infecting the udder? Are these streptococci or the streptococci of the bovine digestive tract distinct varieties or are they, as some maintain, merely temporary variants from the common type? Work recently done in our laboratory, as well as similar work elsewhere, throws light on this question.

Fifty-one cultures were obtained from two herds in which there had been difficulty with infected udders. In one case the epidemic was severe. On the basis of fermentation tests it was possible to separate these cultures into two varieties, evidently related but separated by certain distinctive characters.

Nearly all cultures of both types fermented lactose, saccharose and dextrose, and failed to ferment raffinose, starch and inulin. They differed in the liquefaction of gelatin and the fermentation of mannite and glycerine which were nearly always positive in one type and negative in the other. The more numerous type, the one failing to liquefy gelatine and to ferment mannite and glycerine, had a marked but not unailing tendency to form long chains in broth at 37°. This combination of characters may be represented by a diagram as in Figure 1.

The fermentative reactions of the pus-forming type of streptococci, generally known as *Streptococcus pyogenes*, have been well established by the work of Andrews and Horder, Gordon, and particularly by the results of Hopkins and Lang. All investigators agree that this type ferments dextrose, saccharose and lactose but

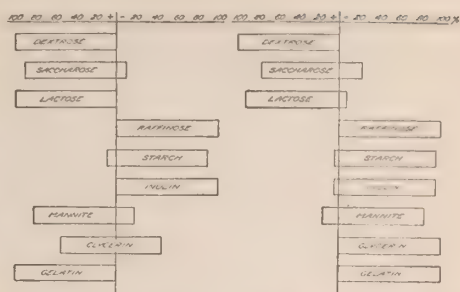


FIG. 1. Diagram showing the fermentation reactions of two types of udder cultures of streptococci.

almost invariably fail to ferment the higher polysaccharides, including raffinose. Apparently alcohols, as mannite and glycerine, may be fermented by occasional cultures. Accepting Hopkins and Lang's arrangement as correct, we find that the diagram for the non-liquefying udder streptococci will serve almost equally well for *Streptococcus pyogenes*.

A tabulation of the fermentation reactions of the 114 cultures isolated from bovine feces presents a different picture. This type is much more active both in the amount of acid produced and the number of substances fermented. Dextrose, saccharose and lactose are almost invariably fermented, raffinose almost always, and starch by about fifty per cent. of the cultures, while a comparatively small number ferment inulin. On the other hand, with the exception of a few cultures fermenting mannite, they are unable to utilize the alcohols. These results confirm those previously obtained by Winslow and Palmer¹ and Fuller and Armstrong.²

¹ Winslow and Palmer, Jour. Inf. Dis., 1910, 7 pl.

² Fuller and Armstrong, Jour. Inf. Dis. 13, No. 3, 442-462.

It may, then, be considered as established that cultures, at least those freshly isolated from pathological sources, are characterized by a weak fermentation of the simpler sugars and an inability to ferment higher polysaccharides and alcohols, while cultures from bovine feces may be distinguished by their activity in fermenting polysaccharoids and inability to attack alcohols.

How do these results correlate with the streptococcus determinations usually made in sanitary examinations of milk? A collection of 42 cultures from samples representing 25 farms were isolated by inoculating lactose bile, incubating at 37° and plating tubes showing distinct chains.

No culture was selected which did not show distinct chains.

The characteristics of this collection were not so sharply drawn as were those from the udders or from feces but, excluding two cultures which were clearly of the fecal type, we may readily divide this collection into two groups, as indicated in Figure 2. One of these is almost identical with one of the udder groups, differing principally in the percentage of gelatine

liquefiers. This is a character which is generally recognized as subject to considerable variation.

The second group has a slightly lower proportion of saccharose fermentors and a larger percentage of mannite fermentors, otherwise the resemblance is marked.

We believe that these results, while they are not conclusive, substantiate the belief that the presence in lactose bile inoculated with milk and incubated at 37° F. of streptococci forming distinct chains, is good presumptive evidence of milk from infected udders. It should be noted, however, that udders may contain streptococci of the pyogenes type without showing physical signs of infection.

Turning to the gas-forming bacteria, we find a large group of lactose-fermenting bacteria, loosely bound into a common family by certain characters and still more loosely separated into subgroups by other characters. The significance of their presence in milk is based on the assumption that their normal habitat is the digestive tract of animals, and that their presence elsewhere is *prima facie* evidence of contamination with fecal matter. In considering the validity of this assumption, we must take into account the wide limits of the strains or varieties included under the term colon group, of which all respond to the presumptive tests and many to the more discriminatory confirmative reactions. The several subgroups are not sharply defined.

It is very difficult to find in the literature any agreement on the characters peculiar to any one variety. Some put

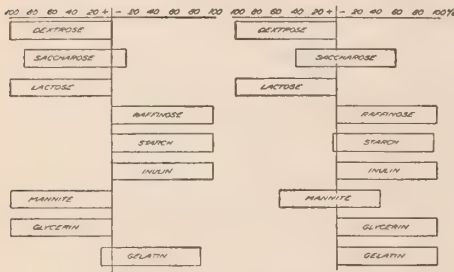


FIG. 2. Diagram showing a possible grouping of the milk cultures of streptococci.

considerable dependence on the appearance of the agar colonies but the differentiation is usually made on the basis of certain sugar fermentations. The gas volume and ratio on which the first separation was made have been practically discarded as variable and of no diagnostic value. The separation into subgroups is not ordinarily emphasized because it is believed that the entire group is of fecal origin.

We began our work on the colon group with a study of about 120 cultures from samples of milk collected in various parts of the country. All these cultures would answer the presumptive tests for colon and nearly all the usual confirmative tests. So far as it was practicable we substituted exact methods of analysis for the ordinary rough determinations of the bacteriological laboratory. The value of this change was particularly evident in the gas volume and ratio. The volume and especially the ratio of carbon dioxide to hydrogen produced under constant conditions was not only constant for individual cultures but was surprisingly uniform for groups of related cultures.

Such discrepancies as did occur became less as simpler media were employed and more nearly perfect methods of analysis developed. On the basis of the carbon dioxide ratio with which were correlated certain fermentation reactions, it was possible to separate the milk cultures into two sharply defined groups. One of these which, for convenience, we shall designate as the low-ratio group, was characterized by a carbon dioxide ratio of almost exactly 1:1. A second group possessed a higher ratio; that is,

a larger amount of carbon dioxide in relation to the volume of hydrogen.

The correlation of other characters with these types of gas ratio was sufficiently marked to make the separation of the two groups clear and distinct.

This brings us to the question of the ultimate source of the two groups. Are they both normal inhabitants of the intestine and do they occur anywhere else in nature?

In an endeavor to answer the first part of this question we made a collection of 150 cultures from bovine feces.

These cultures were obtained by plating on asparagin agar at 30° and lactose gelatin at 20°, and all responded to the usual presumptive tests for colon.

The striking thing about this collection was the remarkable uniformity with which the cultures conformed to a very definite type. This is shown for the CO₂: H₂ ratio in Figure 3. Of the 150 cultures in the collection, 149 gave the 1.1 ratio which characterized about fifty per cent. of the milk cultures. One culture only gave a high ratio and one of the 149 low-ratio cultures was distinguished by the formation of a yellow pigment. The agreement between the feces organisms and the low-ratio cultures from milk is further emphasized by Figure 4. In this plot the percentage of positive results are plotted to the left of the median line and negative results to the right. The feces cultures are represented by solid lines and the milk cultures by broken lines. The entire low-ratio group is logically divided into two subgroups corresponding to *coli communis* and *coli communior*.

The almost complete absence of the

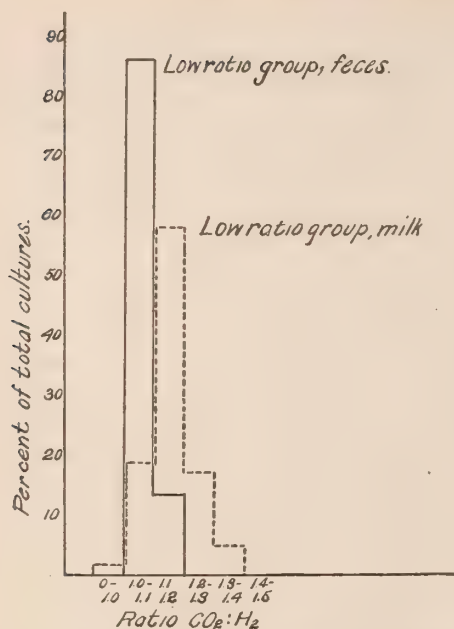


FIG. 3. Frequency of occurrence of CO₂:H₂ ratios.

high-ratio group in bovine feces was so surprising that a special effort was made to isolate additional members of this group. None of these attempts, however, gave any indication of the presence of colon-like bacteria other than those belonging to the low-ratio group, with the exception of the one culture previously mentioned.

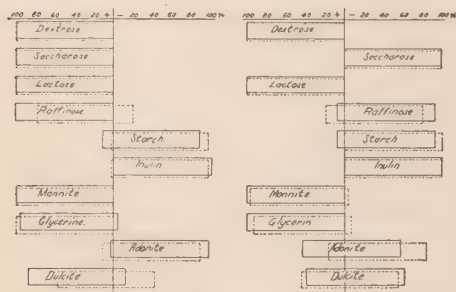


FIG. 4. Two subgroups of the low-ratio groups. Solid lines represent cultures from feces, broken lines cultures from milk.

Following the suggestion of Prescott's work on the occurrence of colon on grains we made a collection of 166 cultures from 33 samples of corn, wheat, oats and barley, kindly obtained for us by the grain standardization laboratory. There were also a few cultures obtained from green oats collected in the vicinity of Washington, with proper precautions to prevent contamination.

Nearly all these cultures responded to the presumptive tests for colon and very many would have passed the usual confirmatory tests.

Chart 5 shows that on the basis of gas ratio and volume the grain cultures may be divided into three sharply defined groups. One of these, represented by 8 cultures, has the characteristic colon ratio. A second group differs from any previously observed in that they produced carbon dioxide only, thus giving a ratio equal to infinity. The remaining cultures gave gas ratios varying from 1.90 to 2.90.

One of the peculiarities of the group was the presence of a considerable number of pigment formers. In order to make more nearly exact comparisons, a small portion of an agar culture was dried on white paper and matched with Ridgeway's standard color plates. It was found that a large proportion of the cultures showed some degree of pigment formation. However, in most cases, the amount of pigment was so small that the culture would not ordinarily be classed as a pigment former. On the other hand, some of the cultures were decidedly colored. In this class were all those mentioned as giving the colon ratio

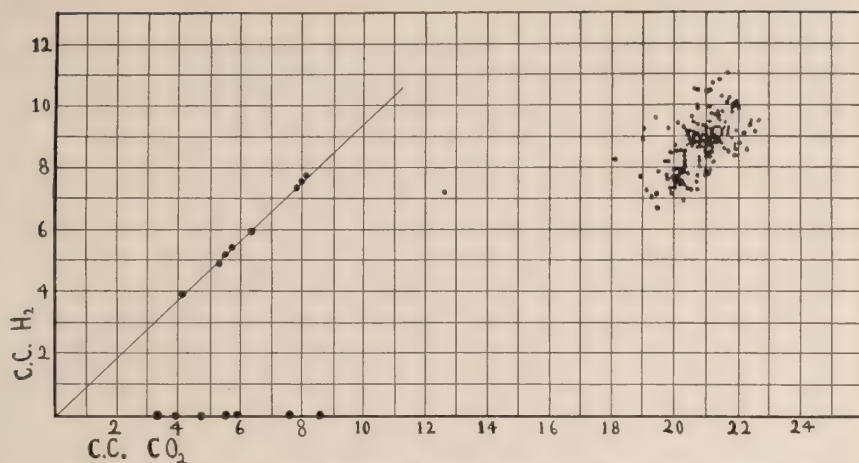


CHART 5. Showing the differences in gas-production of the "high ratio," "low ratio," and ∞ groups of bacteria of the colon-aerogenes type

of 1.1. In all cases the color was a mixture of yellow and orange, varying, however, in shade and tone from a cadmium yellow to cream color or nearly white. The 153 cultures giving a high ratio were divided into 5 tentative groups. This division was based mainly on correlated fermentation tests but there was also a correlation between these tests and the gas ratio. This is illustrated by Table I.

Without going into detail as to the method of classification we may represent the six groups into which we have divided this collection as shown in Table II. In this chart the plus sign indicates that a high percentage, usually nearly or quite 100 per cent., gave a positive reaction. In group C, which included 40 cultures, and D with 90 cultures, the uniformity of reaction was striking. The numbers of cultures in other groups are so small that they are at best only suggestions.

The work on the colon group may be summarized briefly as follows:

The bacteria of the colon type occurring in ordinary market milk may be divided into two very distinct groups, one of which agrees closely with the type found to be the characteristic colon bacillus of the bovine intestine.

The high ratio group found to be numerous in milk evidently occurs in the bovine intestine only very rarely.

The surface of dried grains is the source of a number of types of colon of which one only resembles the low-ratio feces type and this one is distinguished by its ability to form pigment. The type occurring with greatest frequency probably corresponds to the ordinary conception of *B. lactis aerogenes*.

However, many of the grain cultures would answer to the usual tests for *B. coli communis* or *communior*.

It is difficult to avoid the conclusion that while the presence of fecal

TABLE I.

DISTRIBUTION OF CULTURES BY PIGMENT FORMATION.

Numbers and letters in heads refer to plates in Ridgeway's Color Standards and Nomenclature.

	No pigment.	17oy.	17'oy.	17''oy.	19oy.		19'yoy.				19''yoy.				21''yoy.	
		Cad- mium yel- low.	f.	d.	b.		f.	d.	b.		f.	b.		i.	f.	d.
			Light buff.	Pinkish buff.	Apricot yellow.	Light cadmium.	Cream color.	Naples yellow.	Mustard yellow.	Primulin yellow.	Cartridge buff.	Chamois.	Honey yellow.	Isabella color.	Ivory yellow.	Colonial buff.
Type A ..	..	..	..	..	..	..	..	..	..	..	..	1	6	1	..	..
Type B ..	..	2	1	2	..	..	1	..	..	1	..	..	..	..	..	..
Type C ..	..	..	..	..	6	20	..	..	7	7	..	..	..	..	..	..
Type D ..	13	..	2	..	..	..	62	1	..	..	1	..	..	..	7	1
Type E ..	3	..	..	..	..	..	3	..	..	..	..	..	..	..	2	..
Type F ..	..	..	1	..	..	..	7	..	..	..	2	..	..	..	3	..

bacteria in milk may be determined with great certainty, the ordinary presumptive tests and even the usual confirmatory tests do not necessarily prove the contamination of the milk with fecal matter.

TABLE II.

REACTIONS OF TYPE CULTURES.

	A.	B.	C.	D.	E.	F.
Ratio $\frac{\text{CO}_2}{\text{H}_2}$	1.06	∞	2.51-2.80	2.20-2.50	2.10-2.30	1.90-2.20
Pigment	Honey yellow	Cadmium yellow, pinkish buff	Light cadmium	Cream color	Cream color	Cream color
Capsule	—	—	—	—	+	+
Indol from tryptophan	±	—	—	—	+	—
Gelatin	—	+	+	—	—	—
Saccharose	—	+	+	+	+	—
Lactose	+	—	+	+	+	+
Raffinose	+	—	+	+	+	—
Starch	—	—	—	—	+	—
Inulin	—	—	—	—	±	—
Mannite	+	+	+	—	+	±
Glycerin	±	+	+	±	+	±
Adonite	±	+	—	—	+	—
Dulcite	±	—	+	—	+	—

PUBLIC HEALTH PUBLICITY: THE ART OF STIMULATING AND FOCUSING PUBLIC OPINION.

EDWARD A. MOREE,

*Director, Atlantic Division, American Red Cross, formerly Assistant Secretary,
New York State Charities Aid Association.*

III. Making a Meeting Effective.

A LITTLE meeting is sometimes a dangerous thing. Organizing meetings to promote a cause is fraught with pitfalls and hidden dangers. With this phase of the stimulation of public health opinion, as with practically every other of the numerous phases of this new art, long experience has developed principles that no public health agitator can neglect without menacing the prestige of his cause.

An ineffective meeting is not merely a waste of energy and funds. In nine cases out of ten, it is a positive damage. Public health publicity is an effort either to change the lives and habits of the people or to focus or refocus public opinion. As a feature of public health publicity the effectiveness of a meeting must be tested by the following questions: First, Does it catch the public's attention? Second, Does it *focus* that attention sufficiently



An automobile parade will advertise your meeting.

to draw a crowd? Third, Does it move individual or mass opinion in the direction desired?

Unfortunately, some meetings attract public attention by their ineffectiveness; some instruct the masses on the wrong side of the question by emphasizing the inefficiency of the organizers. Some meetings move to action in the wrong direction by giving the impression, through a small and uninterested audience, that the movement has little public support.

I recall very vividly one extremely unfortunate experience with an ineffective meeting. One day I received a telegram that a *mass* meeting was to be held in a certain place at a certain time, to discuss the question of establishing a county tuberculosis hospital, and that I had been announced as one of the speakers. Several former experiences with mass meetings that had failed to mass made me a bit wary of this meeting. I was assured, however, that the women's clubs, the Chamber of Commerce, and the lodges and labor unions of the community were "co-operating"; that the mayor was to preside; that other city officials were very much interested and would lend their support; that the newspapers had already shown a great interest and would during the week devote large space to the meeting.

THE MASS MEETING THAT FAILED TO MASS.

Now all this seemed good. A meeting with such a well-considered plan to make it effective could scarcely fail to be a valuable aid in focusing public opinion on the question of a county

hospital. There were to be five speakers of local prominence including the mayor, who was to preside. The weather on the evening of the meeting could not have been better and there were no counter attractions.

The audience that appeared to hear the arguments on this very important question consisted of the five speakers, the presiding officer, the janitor and one newspaper reporter!

Unfortunately for the cause of the county tuberculosis hospital in that particular community, the newspaper reporter seized upon the opportunity to write a humorous story of the mass meeting that failed to mass (and who could blame her). This gave the supervisors of the county, who had the county hospital under consideration at that time, exactly the impression that such a failure is well calculated to convey.

It is important to note that everything that had been *planned* to make the meeting effective was done. The Chamber of Commerce passed a resolution approving the meeting; the women's clubs of the city passed resolutions approving the meeting; the labor unions and some lodges also passed resolutions; the newspapers nearly every day for a week carried stories varying from a "stickfull" to a half column. The newspaper publicity was excellent.

In this case, as with every ineffective meeting, the very volume of the newspaper publicity was one of the most damaging features of the failure. The higher you raise a public's expectations of a meeting, the greater will be the crash when they fall.

LEARN WHILE LAUGHING

FIVE FREE MOTION PICTURE SHOWS

FOR THE BENEFIT OF PUBLIC HEALTH

Under the Auspices of the City of Yonkers

COME!

YOU, YOUR FRIENDS & FAMILY ARE INVITED

(OVER)

FIRST ENTERTAINMENT

COLUMBUS PARK, Park Hill Ave. and Linden St.

Thursday evening, August 20th, at 8 p. m.

Dates of other Shows to be announced

In case of rain postponement to following evening if pleasant

See daily press for program or any change.



Front and reverse of an admission ticket. The Union label is important.

PUBLIC OPINION MUST BE PRECIPITATED.

The flaw in the situation was this: while a great deal of public opinion had been stirred up, it remained in solution—nothing was done to pre-

cipitate it. Public interest was stimulated but it remained unfocused. The organizers of the meeting got the same results as would a merchant who spent all of his advertising energies in instructing the public on the merits of

his goods and failed to give his address or tell the public where and when the goods would be on sale.

If the organizers of that disastrous mass meeting had distributed two or three thousand admission tickets through the women's clubs, the lodges, the Chamber of Commerce and the other organizations that "coöperated,"

An organizer of a meeting owes three kinds of debts: (1) To his cause; (2) To his audience; (3) To his speakers.

DUTY TO THE CAUSE.

The organizer's duty to his cause is preëminent. He must arouse public opinion by making the meeting impressive. This means not merely gather-



A school children's parade always attracts attention.

the result of the meeting probably would have been vastly different. There would have been a sufficient audience to have furnished a reporter possessing even an ordinary journalist imagination with sufficient basis for a "large and enthusiastic audience" or at least an "audience that made up in enthusiasm what it lacked in numbers."

ing a large crowd, but it also means providing speakers whose standing in the community will establish in the public mind the fact that the movement has the approval of people whose opinions count. If speakers from outside the community are on the program, they must be authorities on the subjects they are to discuss. It is necessary to inform the public of this

authority through publicity in advance of the meeting.

Providing an interesting program is a large part of the organizer's duty to his audience. He also has program responsibilities to his cause, aside from making the meeting impressive. He must provide speakers that will add to the sum total of the community's knowledge on the subject under dis-

cussion. This does not mean, always, speakers of great scientific reputation. Out of the mouths of wise men there frequently cometh forth unintelligible sound.

Another most important responsibility of a meeting organizer is to see to it that the influential people in the community, particularly public officials whose support for the cause is neces-

Four Reel Feature

"THE WHITE TERROR"

A Thrilling Silent Drama

And Also an Interesting Lesson on the

Patent Medicine Fraud

TO BE SHOWN AT

Tuberculosis Mass Meeting

Thursday Evening, November 4, 8.15 P. M.

Auditorium, Education Building,

Hawk St. Near Washington Ave.

GOVERNOR WHITMAN

Commissioner Biggs and Others

WILL SPEAK

Admission Free

This ad. in four Albany papers filled a hall with 1,000 persons in opposition to an important concert.

sary, are invited. This is so vitally important that special efforts should be made to secure their attendance. It is usually well worth while to fix the date of the meeting only after consulting the important persons in the community as to their ability to be present. Telephone reminders on the day of the meeting and providing special conveyances sometimes suc-

ceed in securing the attendance of busy persons where ordinary methods would fail.

HAMLET WITH HAMLET LEFT OUT.

I have a very vivid recollection of traveling several hundred miles to address a "mass" meeting (this also failed to mass), for the purpose of focusing public interest on the desira-

== TONIGHT ==

"The White Terror"

*Thrilling Silent Drama Based
on the Death That Lurks in the*

Consumption "Cure" Fraud

**Governor Whitman,
Commissioner Biggs and Others
WILL SPEAK**

Tuberculosis Mass Meeting

Auditorium Education Building

Hawk St., Near Washington Ave. 8:15 P.M.

Change your advertising on the day of your meeting. This followed the "Four Reel Feature" advertisement.

bility of turning over the public health nursing of the community to the Department of Health. Upon asking the chairman to introduce me to the mayor and other city officials, I discovered that not only had no special effort been made to secure the attendance of the mayor, the board of health and the aldermen, but they had not even been invited! It is little to be wondered at that the mayor and the aldermen and the other officials when called upon to appropriate funds for taking over the public health nursing of the city, failed to respond with any great degree of enthusiasm.

DUTY TO THE AUDIENCE.

It should be possible to indict and convict of highway robbery any person who steals time from audiences by enticing them into meetings upon the promise of interesting and instructive programs which prove to be neither

interesting nor instructive. Many meetings would fall under the constitutional prohibition against cruel and unusual punishment. It sometimes seems that meeting organizers not only choose their speakers with the idea of torturing as many of their fellow beings as they can entice into their meetings, but also choose their halls for the sole purpose of making the punishment inflicted by the speakers as unpleasant as possible. Nothing can be worse than listening to speakers who have nothing to say and who cannot by any possibility say it interestingly, unless it is listening to them in a hall that is so poorly ventilated that you must stick pins into yourself to keep awake, and the acoustics of which are so poor that you can't even hear the man who has nothing to say and who doesn't know how to say it. There is not a reader of this article who has not endured not one, but many such horrible experiences.



FREE ! FREE ! FREE !
 You Are Invited to Attend a Mass Meeting at the
 State Armory, Sunday Afternoon

December 12, 1915

OSWEGO'S OBSERVANCE OF

At 3 O'Clock Sharp

National Tuberculosis Sunday

→ UNDER AUSPICES OF COMPANY D ←

LOCAL COMMITTEE

John Dougherty, Chairman. Dr. H. S. Albertson. Capt. T. A. Ball. W. C. Brown. H. J. Cooper. John C. Henry. John H. Hourigan. Joseph J. McGrath. Richard J. Schuler

SPEAKERS

Francis E. Cullen and Geo. J. Nelbach
 Secretary State Charities Aid Association

Chorus of 100 Voices Under the Direction of Wm. C. Brown of the Oswego Milling Co.
 Will Sing Gounod's "Sanctus" and "To Thee, O Country"

Soloist, Charles Dehm

Concert by Phillips' Band

Accompanists, Prof. Joseph J. McGrath, Richard J. Schuler

A page paid-for advertisement drew a crowd in Oswego. Note the chorus which is advertised.

Those of us who are addicted to attending conferences, or whose jobs force attendance, either deserve what we get or must perforce endure it.

The lay public, however, has the right to expect different treatment from us than that which we force upon ourselves at county, state and national conventions.

MAKING UP A PROGRAM.

Too often we fail to live up to our two chief responsibilities to our audience: (a) providing an interesting program and (b) providing a hall where the audience in some degree of comfort can hear and see the performance.

Many meetings *happen* in about this

fashion: A committee is called together for the purpose of considering some phase of a public health campaign. About the first suggestion that is made is "Let's have a mass meeting." Why a meeting cannot be simply a meeting and nothing more, but must always be a "mass" meeting I have never been able to decide, but the fact remains that most meetings are "mass" meetings. I would like to organize a "disintegrated" meeting and note the result.

The suggestion for a mass meeting is immediately adopted, and then from all sides come suggestions for speakers. These are usually chosen because (a) they are prominent in the locality; (b) they are supposed to have some



An exhibit still attracts crowds that will attend your meeting if urged at the right time.

needed in a campaign for an infant welfare station, for example, may know absolutely nothing about the subject he is to discuss, and may make a very unfortunate presentation of the subject, and may, furthermore, be an unutterable bore as a speaker. Then, on the other hand, a speaker who knows more or less about his subject,

audience you have in mind. If you are to reach out especially for professional men you will choose your speakers with their scientific attainments particularly in mind. I have no doubt that many will disagree with me when I advise, for an audience that will be composed chiefly of laymen, sacrifices on the scientific side in order



Members of a lodge attending meeting in a body.

may be unable to express his knowledge or his opinions in a manner that will be either intelligible or interesting to laymen.

It is difficult to say which is the more important if one has to choose—impressive scientific knowledge or ability as a public speaker. The test to apply, naturally, is the capacity and requirements of the particular

to secure speakers who have the power to interest their audiences.

SELECTING A HALL.

Having brought together enough names from which to make a selection, the committee proceeds to the consideration of a hall. This is usually chosen because it is centrally located, and very little, or at the best too little

thought is given to the other important requirements for a meeting place; namely, (a) size; (b) ventilation; (c) acoustics. Every one of these con-

expense of proper size, ventilation and acoustics, will often do the cause more harm than good.

A centrally located hall may be

FREE TUBERCULOSIS EXHIBIT

WALTON RINK JAN. 30 - FEB. 4, 1910

Tuberculosis is spread by Spitting

P L E A S E

Do not Spit on the floor of this car



A handbill for use in a street car that the car company might like to use because of the anti-spit warning.

siderations are important. It is dangerous, however, to consider any one to the exclusion of the others. Central location is highly important, of course, but central location obtained at the

many times too large for the audience. Your speakers will find themselves confronted by dismally few persons scattered over vast areas of empty seats. This is not only dampening to

the ardor of the speakers, but is exceedingly damaging to the cause. Even a small audience loses much of its depressing quality in a hall that fits it.

The convenience of the location of your hall may be the chief factor in bringing a large audience to your meeting. If, however, your hall is too small to hold the audience; if it is so poorly ventilated that a large portion of your audience goes to sleep; and if its acoustics are so bad that the speakers cannot be heard, your central location will prove to be a damage rather than a benefit to your cause.

People do not like to climb stairs. Any hall above the first floor is usually undesirable. A hall above the second floor should practically never be considered.

Safety in case of fire is usually given no thought at all. I have attended meetings held in second or third floor halls in buildings that were veritable fire traps. Any occurrence that might start a panic, such as a disturbance or even a small fire, would have resulted in loss of life. This may seem to be an unimportant point, but scarcely a year goes by that does not register one or more catastrophes caused by crowding large numbers of persons into halls with inadequate exits and with little or no fire protection. This should be a major consideration if a large portion of your audience is to be children.

DUTY TO SPEAKERS.

In discussing the make-up of a program I did not try to minimize the difficulty of obtaining good speakers.

Speakers acceptable from all important points of view who are willing to give their services and who are willing to travel long distances on a gratis mission are scarce.

One reason for this is that speakers are meeting-shy. Those of us who hunt know that it is very easy to make a good dog gun-shy. From unfortunate experiences in early youth many dogs become so afraid of a gun that even the sight of one will send them scurrying back home with their tails between their legs.

Nearly every man who is much sought after as a speaker has had experiences with mass meetings that failed to mass; with meetings of important groups that failed either to group, or be important.

One or two experiences of this kind make a speaker meeting-shy. Most invitations to speak at meetings are turned down by public men because they know of a certainty, bred of woeful experience, that if they accept they will have their trouble for their pains.

The first duty of a meeting organizer to his speakers is to provide an audience.

The next most important duty probably is that of simple, ordinary, common courtesy. This article does not intend to degenerate into a dissertation on rules of etiquette. It will achieve a worthy purpose, however, if it succeeds in implanting in the minds of meeting organizers the idea that possibly a person who travels some distance to address a meeting deserves certain attentions. Each one is small and unimportant possibly, but

they are important in the mass as adding to the speaker's comfort and increasing his value as part of a program. An associate looking over my shoulder as I write this, says: "Let us conserve our country's natural gas resource by being decent to it."

The following is a speaker's bill of rights:

1. To be given definite information as to the following points:

- a. The date, hour and place of the meeting.
- b. The subject he is to discuss and the length of time allotted to it.
- c. The probable size of the audience.
- d. The kind of audience, the names of the other speakers and some information about them and their topics.
- e. The definite purpose of the meeting, in considerable detail.
- f. The purpose of the whole campaign if the meeting is one of a series of events.

2. A memorandum giving detailed information on all local factors that have any relation whatever to the purpose for which the meeting is called, should be mailed the speaker as soon as possible after he has accepted the invitation to speak.

3. A memorandum should be sent him giving the hour of departure and arrival of the most important trains, both going and coming.

4. He should be relieved of the responsibility of securing hotel accommodations. (Most speakers from a distance prefer to stay at a hotel rather than to be entertained at some-

one's home, unless it happens to be a friend or acquaintance.)

5. He should be told whether or not to wear evening clothes.

6. If he arrives close to the hour of the meeting he should be met at the station with some sort of a conveyance. This is especially important if he happens to be a stranger to the community, and may avoid delay in the meeting.

7. Most speakers coming from a distance will appreciate also being met at the station by a member of the committee who can confer with him on the plan and purpose of the campaign, and answer the many questions that always arise in the minds of speakers who conscientiously try to "deliver the goods."

8. If the speaker is to receive his expenses or an honorarium, or both, he should be relieved of the responsibility of finding out how and when to present his account.

9. A speaker who gives his services deserves at least to have his expense account settled promptly upon the presentation of his memorandum.

10. A speaker coming from a distance at considerable sacrifice deserves to be relieved of the torture of listening to long-winded introductory remarks by the chairman and other local lights. You may feel at liberty to thus torture your friends and neighbors but it's no way to treat a stranger. It's often done but it isn't hospitable. If you must have bores on your program give your speaker a ticket of leave by telling him as nearly as possible the exact hour of his appearance.

11. Tell your chairman as tactfully

as you can that a really important speaker objects to fulsome praise. Dr. Edward T. Devine, director of the School of Philanthropy of New York, once told a story that I am going to repeat here so that long-suffering speakers may have a defense against oratorical buncombe hurled at them by well-meaning chairmen.

A district leader was called on the 'phone by a ward boss and the following conversation ensued:

"Mr. Murphy, do yez know Pat McGuire of the tent?"

"Yes, I know him?"

"Well he's a moighty foine mon, and a shtrong party worker. Oi want yez to do all yez can fer him. Git him a job, now won't yez. He's a foine citizen."

"I'll do what I can for him, Mulligan. Your recommendation counts big with me."

A few moments later Mr. Murphy's 'phone rang again.

"Is this Murphy?"

"Yes."

"This is Mulligan of the tent'. Now about M'Guire. Wot I said about him the other minit don't go, see. The dom loafer wuz settin' right here at the toime. He's a thief and a blackguard."

12. Your speakers deserve to be introduced by a person who can do it in a few words that will give the audience a definite idea as to what they have done and why they were invited to speak on that particular occasion. The organizer of the meeting should see to it that he gets the needed information from the speakers and should also see to it that it gets to the chairman of the meeting in time for him to become familiar with it. A man who is unwilling to familiar-

TUBERCULOSIS EXHIBIT
STATE ARMORY
MAY 14-19
INCLUSIVE
Stereopticon Lectures Daily
ADMISSION FREE

Reptone Photo, Holmes, N. Y.

A poster in red and black. Contains little but says much.

**VISIT THE TUBERCULOSIS
EXHIBIT
PARISH HALL
FEB. 19-24.
MASS MEETING
FRIDAY NIGHT FEB. 24TH
LYCEUM THEATER
ADMISSION FREE.**

JTHACA SIGN WORKS.
Utah--N.Y.

Reduced from a large canvas sign to be attached to wagon sides.

ize himself with information of this kind, or who feels that a proper introduction for speakers is not important, should never be chosen as chairman of a meeting.

**BY-PRODUCTS OF AN OUT-OF-TOWN
SPEAKER.**

The out-of-town speaker has certain potential by-products that are very often neglected by meeting organizers. If he is sufficiently prominent and enough of an authority on the subject he is to discuss, publicity that is extremely valuable to your cause may be obtained in the newspaper articles concerning him and his work, preceding the meeting. It

will probably be possible to get from him an interview on some subject akin to the one he is to discuss. Such interviews can frequently be constructed out of previous addresses or pamphlets or books that the speaker may have written.

On the day of his arrival or the day following the meeting valuable conferences may be arranged between an out-of-town speaker and important local officials or other prominent citizens whom it is desirable to interest in the cause. Frequently a luncheon conference or a private dinner preceding the meeting to which a few of the most important citizens of the community are invited, and dur-

ing which the speaker may more or less informally discuss the work in which he has acquired his reputation, or the work of other communities along similar lines, will result in greater benefit to the cause than the main purpose for which the speaker has made his journey.

OBLIGATIONS OF THE SPEAKER.

No one should accept an invitation to address a meeting which has caused the organizer considerable effort unless he is willing to do everything in his power to make the meeting effective. The most important of his duties, of course, is to prepare an effective address on the subject assigned to him. Many speakers who are "full of their subject" pride themselves on their ability to deliver an extemporaneous address. This leaves them prey to circumstances which they may not be able to control. A too hearty dinner has spoiled more than one extemporaneous speech. A slight interruption at the beginning of an extemporaneous address has more than once marred the whole speech by side tracking the main thought. A cold, unresponsive audience frequently makes it impossible for a man to throw himself into his subject with the abandon that is necessary to make an effective extemporaneous address.

Even admitting extraordinary familiarity with a subject, a speaker can never guarantee to "deliver the goods" unless he takes considerable time to prepare himself. It is of course true that a speech that is read is never as effective as one delivered either extemporaneously or with very slight reference to notes.

PUBLICITY LEADS IN HEALTH WORK

NEW YORK OFFICIAL SAYS PAPERS SAVE LIVES

Declares National Newspaper Advertising Campaign Would Accomplish Tremendous Good in Fight Against Disease.

Rochester, N. Y., Sept. 9.—"Printers' ink is saving more lives than any other single agency employed by modern health workers," said E. A. Morce, assistant secretary New York State Charities Aid association, before the American Public Health association.

"Printers' ink," said he, "should be entered in the pharmacopoeia as an accredited remedy for human ills. Among other things, it prevents tuberculosis and builds hospitals to cure it; it saves the lives of children and controls epidemics of smallpox. Thousands of babies are today alive in New York state largely because big doses of printers' ink were administered to the public by the state and local departments of health. One of the most important cities of this state endured an epidemic of smallpox that increased rapidly for a whole year. Then the newly reorganized department of health announced that its policy in dealing with local epidemics would be state-wide publicity. When the people of that city realized that their health standards were to be broadcast through the pages of newspapers and would increase the knowledge of the people, the state whose lives were saved by the officials of the department of health, the program was successful."

This is the result of preparing a news summary of an address and sending it to the newspapers in advance of delivery.

As between an ineffective extemporaneous speech and a less spectacular written address, however, there is no choice. The advantages are all with the latter.

This is especially true when one

considers publicity. It is always possible to get more publicity and more accurate publicity from a written paper than from one that is not. The unfeeling brutality with which the ordinary reporter deals with the oratorical efforts of the extemporaneous speaker frequently brings tears of anguish or blushes of shame to the one who leaves himself open to such mistreatment.

This brings me to the next obligation of the speaker; *i.e.*, the preparation of a short, intelligible abstract of his speech. A newspaper abstract of a speech is not a list of headings and is not a summary in the ordinary sense of the term. A reporter listening to a speech selects from the many possibilities offered, one or two important points and elaborates these into a story. A speaker will, without exception, find himself better treated in the newspapers if he adopts this plan in preparing his abstract. The abstract may be sent to the meeting organizer for such use as he cares to make of it or sent direct to the newspapers as circumstances dictate.

The torture of speakers and audiences by organizers is only equalled in brutality by the torture of organizers and chairmen by speakers who fail to confine themselves to time limits. A half hour speech that runs an hour is brigandage coupled with outrage.

If unforeseen circumstances arise, making it impossible for the speaker to keep his engagement or to keep it on time, the organizers of the meeting have the right to expect that he will inform them immediately.

SECURING A CROWD.

It would be impossible in the space allotted to this article to consider in detail all the possible schemes to secure audiences. Some of the most important plans that have been tried will be described briefly.

There are so many meetings of so many different kinds that it is very difficult indeed to arouse interest in a plain meeting without attractive additional features. If the occasion is sufficiently important to secure a speaker of nation-wide fame he will no doubt prove to be the only attraction that is necessary to draw a crowd. There are very few speakers in this country, however, who can be depended upon to do this without a great deal of publicity, and without working many different plans to arouse public interest and focus it on the meeting.

Some feature, therefore, that is even more or less removed from the main purpose of the meeting is sometimes necessary. A band or an orchestra that can furnish amusement and keep up enthusiasm before the meeting and during its course is frequently a valuable aid in attracting a crowd. The Oswego (N. Y.) Tuberculosis Committee found that a chorus attracted much attention, and not only in and of itself added to the audience, but that each member of the chorus brought several friends.

Motion pictures always arouse interest. There are so many films now available that it is possible to get two or three interesting subjects that will fit well into almost any public health program. If these are used their stories should be presented in the news-

papers previous to the meeting, and will constitute a very important publicity medium.

If a large crowd is desired (and if a large crowd is the aim no reasonable effort should be spared to achieve it), it will pay well to devote a considerable sum of money to publicity. There is no way of securing publicity more effective than employing a newspaper man on part time to prepare articles for all of the papers and to see to it that they get to the papers at the proper time and in the form that the newspapers will find most convenient for their use.

Aside from the publicity in the news

columns, paid-for space will nearly always produce satisfactory results. It is a serious mistake to spend a large sum of money in hiring a hall and for the other expenses incident to organizing a large meeting, and then fail to secure a crowd through economy in publicity and other efforts to focus the public's attention on the meeting.

An interesting scheme which proved successful in getting the right kind of an audience for a public meeting was tried recently in Indianapolis by Dr. C. N. Hurty, secretary of the State Board of Health of Indiana.

Doctor Hurty was organizing a public health mass meeting in a hall that

Don't Give Consumption to Others

The spit and small particles coughed up and sneezed out by consumptives, and by many others who don't know they have consumption, are full of tiny living germs.

THESE GERMS ARE THE CAUSE OF CONSUMPTION

Don't spit on the sidewalks--it spreads disease

Don't spit on the floors of your rooms

Don't spit on the floor of your workshop

DON'T LET OTHERS GIVE CONSUMPTION TO YOU

**Committee on the Prevention of Tuberculosis
State Charities Aid Association.**



TUBERCULOSIS EXHIBITION

**Middletown
State Armory**

April 5th to 10th, inclusive

ADMISSION FREE

**Illustrated Lectures DAILY AT 3 AND 8
O'CLOCK P. M.**

Front and back of an admission card that carries propaganda material used in pay envelopes and distributed in churches.

would hold approximately six thousand persons. He particularly wanted to reach the people in the congested districts of the city. He recognized the importance of having the program interesting as well as instructive and adopted the rather novel scheme of introducing vaudeville acts between the addresses. The professional services were contributed. This in itself would have attracted a large crowd, but it would not necessarily reach the people the meeting was intended especially to benefit.

To accomplish the latter purpose he prepared tickets of admission and saw to it that the policemen of the city whose beats were in the districts he especially wanted to reach, were supplied with large quantities of these tickets. Through the police, the firemen, labor organizations, social

workers and others, he distributed these tickets broadcast in the congested districts of the city. In this way he filled his auditorium to overflowing with exactly the class of people that his meeting was intended to benefit. They saw a good show, and carried away with them not only the pleasant impression of an amusing evening, but also the information that was contained in the addresses which were plentifully mixed with the vaudeville entertainment.

The following plan was followed with success by a tuberculosis committee in organizing a meeting in a city of twenty thousand. This plan resulted in a crowd of fifteen hundred persons in a state armory. The meeting was one feature of a week's campaign which centered about an exhibit shown in the armory.

"NO UNCARED FOR TUBERCULOSIS IN 1915."

Program

MAYOR WILLIAM COLLINS CASEY, Presiding.

"The Nature of Tuberculosis and the Importance of Hospital Care for Preventing the Spread of the Disease."

DR. FRANCIS E. FRONCZAK,
Health Commissioner of Buffalo.

"The Rights and Duties of the Individual in the Prevention of Tuberculosis."

DR. J. W. LESEUR,
Medical Expert, Western Division, State Department of Health.

"Tuberculosis from the Standpoint of the Physician."

DR. EDWARD CLARK,
Medical Officer, State Department of Health.

"The County Hospital for Tuberculosis."

DR. MONTGOMERY E. LEARY,
Supervising Director of the Rochester Public Health Association.

"NO UNCARED FOR TUBERCULOSIS IN 1915."

Will Batavia Act?

**In Order to Prevent the Spread of Tuberculosis
The Following Measures Should be Instituted:**

1. The physicians of this city and county should comply with the provisions of Sections 120-31 of Article XVI of Public Health Law, constituting Chap. 45 of Consolidated Laws, requiring a complete registration of all living cases of Tuberculosis with the local health officer.
2. The Board of Supervisors should provide a County Hospital for Tuberculosis, and not in connection with the Almshouse, where no one will go.
3. A Tuberculosis Dispensary, where free examination may be had by any one who suspects that he has Tuberculosis, but is unable to employ a physician, where reliable information and literature may be had free of charge, and where suitable relief will be administered.
4. A visiting nurse to be attached to such dispensary.
5. A relief committee to provide for the needy families of cases where the wage earner is incapacitated and is undergoing treatment at a sanatorium, hospital or at home.
6. A suitable building code to prevent the construction of buildings and tenements that are to become centers of congestion and infection.
7. Supervision of food supplies by the Board of Health, especially the meat and milk.
8. Inspection of public lodging houses by the Board of Health.
9. An educational center from which a continual campaign can be conducted with a view of securing such measures as:
 - a. The cleaning of streets by hushing with water except in freezing weather, instead of dry sweeping.
 - b. The adequate ventilation of school houses, churches, theaters and all other public buildings, and the cleaning of the same by damp sweeping and dusting instead of dry sweeping and dusting.
 - c. Frequent illustrated lectures and a distribution of leaflets, leaflets to school children, teachers, fraternal orders, labor unions, etc.

Two pages of program showing the use of propaganda material.

1. The list of speakers, of course, was attractive. In addition to this two interesting motion pictures were advertised and their stories were told in the papers previous to the meeting. A military band paraded the principal streets and gave a concert in front of the hall previous to the meeting and in the hall at the opening of the program.

2. Paid advertising was run in all the newspapers of the city.

3. A carefully prepared "form" letter was multigraphed on the personal paper of one of the most influential friends of the movement. These were signed personally and addressed individually to two or three hundred of the leading people of the community. The letter told the purpose and importance of the meeting and urged each recipient to be present.

4. The program of the meeting was

printed in an attractive folder upon which was also displayed information on the movement and other propaganda material. These were sent out in advance of the meeting to two or three hundred of the most prominent people of the city.

6. Prominent people wrote to the newspapers, calling attention to the importance of the movement and to the desirability of having a large crowd at the meeting.

7. Important literature was sent to the leading people of the city.

8. The clergymen announced the meeting from their pulpits and printed something about it in their church bulletins the Sunday previous.

9. Four or five illustrated articles were published in the local papers, showing what other cities had done, particularly cities of the same size.

10. A full discussion of the speaker

"The Public Have Recognized Their True Foe In Tuberculosis, and They Are Stirring to The Combat Throughout The Civilized World."—Welch.

MASS MEETING TUESDAY 8 P.M.

State Armory

The Struggle of the Public
To Suppress Tuberculosis

EXTRACT FROM AN ADDRESS BY GOVERNOR CHARLES E. HUGHES

"If we had through the misfortunes of war, or the sudden rise of pestilence, or through some awful calamity, the destruction of life that annually takes place on account of the spread of this disease (Tuberculosis) we should be appalled and mass meetings would be held in every community and demand would be made that the most urgent measures should be adopted. It is only because we are accustomed to this waste of life and are prone to think that it is one of the dispensations of Providence that we go on about our business, little thinking of the preventive measures that are possible."

ADMISSION FREE!

Attend the
Anti-Tuberculosis
Mass Meeting
T O - N I G H T

Odd Fellows' Temple
ELLICOTT STREET

Prominent Speakers

ADMISSION FREE!

Press of The Times, Baitavia, N. Y.

"Throwaways" with and without propaganda.

was given to the newspapers, bringing out what he had done, his writings and why he was considered an authority on tuberculosis.

11. Several thousand admission tickets were distributed throughout the city through the schools, the churches, lodges, labor unions and women's clubs. These tickets advertised the fact that the meeting was free and the fact that tickets were distributed kept very few, if any, persons who might not have secured tickets from trying to get into the meeting. They were an additional means of publicity, and the possession of a ticket in many cases gave the possessor a feeling that in a measure it was necessary for him to attend.

In addition to the schemes employed for the above described meeting many others are possible.

Unless the dignity of the occasion would be sacrificed it would be possible to send wagons about the streets on the day of the meeting, covered with canvas signs.

Street car advertising is always valuable, although it is rather difficult to obtain. The street car companies sell the advertising privilege usually to distant corporations, so that except in rare instances nothing will be possible beyond hanging a small bundle of dodgers in the cars or placing a sign on the fenders.

In the larger cities billboard space can be obtained and used with profit.

Merchants frequently permit dodgers to be placed in their bundles and it is also possible to put small enclosures with the bills going out from gas, telephone and water companies.

Similar enclosures in pay envelopes give valuable publicity.

A committee of from twenty to one hundred women will render good service by taking a list of important names and calling up from five to twenty-five persons each on the day of the meeting.

The one big fact to remember, however, in organizing any kind of a meeting is this: that once you are committed to it you can afford to spare no effort and no reasonable expense in making it a success.

Usually the many other possible means of securing publicity will get you more of it and will not be so fraught with danger to your cause. Occasionally, however, a meeting seems to be absolutely necessary. If this is the case, decide first on how large a meeting is necessary or how large a one you can get, and then leave no stone unturned to reach your goal. Whether it be a group meeting of a few interested citizens, a meeting for the organization of a committee, a meeting that is intended to get together only a hundred or so of the most important citizens, or whether it is to be a so-called mass meeting,—its effectiveness and its value to your cause depends upon how nearly you approach your goal as to size and how impressive are the speakers.

Considering meetings in general, and realizing the large proportion of unsuccessful ones, about the best advice that can be given to a committee considering the question is—Don't do it! But if you must, do it hard.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

THE annual meeting of the Massachusetts Association of Boards of Health was held at the Brunswick Hotel, Boylston Street, Boston, Thursday, January 27, 1916; Dr. M. J. Rosenau, president, in the chair.

The treasurer, Dr. Francis G. Curtis, of Newton, presented the following report which was accepted and placed on file:

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH

In account with FRANCIS GEO. CURTIS, *Treasurer.*

INCOME.

Balance for 1914.....	\$1,299.50	
Sale of tickets for lunch, April meeting.....	\$193.50	
Tickets for other lunches...	3.00	
Extra Journals.....	14.50	
Dues and Subscriptions....	474.50	
Interest.....	44.72	730.22
Total receipts.....		\$2,029.72

EXPENDITURES.

Reporting meetings.....	\$208.90	
American Public Health Ass'n (Journals).....	534.63	
Expenses of the Secretary ..	73.23	
Expenses of the Treasurer ..	35.00	
Committee expenses.....	12.30	
Legal expenses (2 years)....	300.00	
Expenses, January meeting.	14.50	
Cigars.....	5.10	
Lunch, April meeting.....	200.00	
Rent of Halls, April meeting	84.00	
Total expenses.....		\$1,467.66
Balance to 1916.....		562.06
		\$2,029.72

Of the balance, \$420.86 is in Savings Bank
97.70 is in National Bank
43.50 is in hands of Treasurer

Respectfully submitted,

(Signed) FRANCIS GEO. CURTIS, *Treasurer.*

The following were elected to membership in the Association:

Miss Mary Beard, 561 Massachusetts Ave., Boston, Mass.; Mr. Julius Chandler, Duxbury, Mass.; Mr. George M. Gifford, Brockton, Mass.; Dr. Loring Grimes, Swampscott, Mass.; Dr. P. E. Hurley, Holyoke, Mass.; Mr. John C. Lee, Greenfield, Mass.; Dr. George Mossman, Westminster, Mass.; Mr. Franklin B. Stacey, Andover, Mass.; Mr. John W. Tapper, Lynn, Mass.; Miss Mary C. Wiggin, 4 Joy St., Boston, Mass.

Dr. G. L. Tobey of Clinton, chairman of the Legislative Committee presented the following report which was accepted and placed on file:

REPORT OF THE LEGISLATIVE COMMITTEE TO THE MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

Your Legislative Committee submit the following report:

During the session of the Legislature of 1915, your committee examined and kept track of all the bills introduced in the Legislature, affecting the public health. In doing this, your committee gave a detailed examination to over fifty bills which were introduced in the Legislature.

The bills which appeared to be most important were given particular attention, and your committee attended or was represented at the hearings upon them. The legislation which perhaps attracted the most attention along the lines of public health during the last year's session was the act in reference to excluding certain ingredients from the manufacture of bread. It will be remembered that the hearing upon this bill lasted for several days and received a great deal of attention in the public press. Your committee was in attendance at these hearings with counsel and appeared in favor of the enactment of some legislation along the lines of the

bill proposed. These hearings resulted in the enactment of Chapter 258 of the Acts of 1915, which provides that bread, manufactured to be sold by the loaf shall be made from one or more of the following substances:

Wheat flour, rye flour, corn flour, lard, vegetable oils, butter, sugar, malt extract, corn syrup, salt, yeast, water, milk, corn sugar, serial flakes; and any other substance commonly sold at retail as food. The bill also provides, that bread in the manufacture of which any other materials are added, shall be labeled with a statement indicating the presence of such other materials, and that no materials shall be used which are poisonous or which are injurious to health. The bill also provides penalties and means for its enforcement. While there was much other legislation affecting public health there were no other bills which began to attract the attention of the public as the above. No legislation was enacted which seriously changed the operation of the laws affecting the production and sale of milk.

During the session, your committee was represented by Amos T. Saunders as legislative counsel, the same as for the year, 1914.

Respectfully submitted,

GEORGE L. TOBEY,
Chairman.

It was voted to appropriate \$150 for the current year for legal counsel for the Committee on Legislation and to continue the committee.

It was voted that before any Association moneys are appropriated requests for the same be referred to the Executive Committee for its consideration and recommendation.

It was voted that it is the sense of the Association that at least two of the meetings each year ought to be held outside of Boston.

It was voted that applications for membership be accompanied by dues of one dollar.

REPORT OF THE NOMINATING COMMITTEE.

MR. COFFEY: Mr. President, the Nominating Committee report in favor of Dr. Frank A. Woods of Holyoke for president, Dr. F. X. Mahoney of Boston for first vice-president, Dr. W. W. Walcott of Natick for second vice-president, Dr. F. H. Slack for Secretary, Dr. F. G. Curtis of Newton for treasurer, and for Executive Committee Dr. A. MacKnight of Fall River, Dr. C. E. Simpson of Lowell, Dr. F. H. Thompson of Fitchburg, Mr. R. L. Newcomb of Salem and Dr. F. G. Wheatley of North Abington.

The report of the Nominating Committee was accepted and the above named persons unanimously elected as officers of the Association for the ensuing year.

Doctor Palmer, of South Framingham presented the following resolution:

Resolved, That in view of the urgent need of immediate provision for tuberculosis hospitals for the care of the advanced and hopeless cases, the Massachusetts Association of Boards of Health at its annual meeting respectfully and earnestly urge upon the members of the Legislature to hasten, so far as possible, the building of the so-called district hospitals for the care of such cases.

Discussion.

DOCTOR PALMER: I have only just a word in explanation to give why I present the resolution. I was called this morning, as I presume all of you are, to some critical, hopeless cases, that cannot be cared for in their own homes. Already steps have been taken towards the establishment of these hospitals, and the object

of this resolution is to use what influence we have to urge upon our legislators immediate action to hasten the day when we can have proper homes for these hopeless cases of tuberculosis, thereby avoiding danger to their families and the communities where they exist.

MR. BORDEN: Mr. Chairman, I am not fully informed on the proposition, but I understand a bill is being prepared concerning the establishment of district hospitals. What that bill will contain I don't suppose anybody present knows. It seems to me that to endorse a plan of district hospitals without knowing the plan is to put ourselves on record unintelligently.

THE PRESIDENT: This endorses the plan, irrespective of the wording of any bill. A plan is probably in the minds of many of this Association as a good plan, and perhaps we all believe in it. It is a good plan.

MR. BORDEN: Of course I am not so sure in my own mind that it is a good plan; perhaps all other gentlemen are agreed that it is. The question has been threshed out for several years as to the establishment of state hospitals and now district hospitals. Coming from the larger cities, we have no particular interest in it, except as the interest exists throughout the Commonwealth in the establishment of district hospitals. Just what is meant by district hospitals I am sure I don't know, because in trying to learn something about them I could not find out what was planned for those district hospitals and how they were going to be established.

THE PRESIDENT: Perhaps Dr. G. R. Kelley of the State Health Department, will tell us something about the plan for district hospitals in the state.

DOCTOR KELLEY: Mr. Chairman, I don't feel that I can state with any assurance what legislation will be recommended, as you all probably remember, the last General Court passed a resolve authorizing and directing the State Department of Health to make investigations as regards the advisability of establishing county or district hospitals for the care of consumptives, and also directing the department to make a report to this General Court, accompanied with proposals for legislation. Following the line of the resolve, the eight district health officers have made rather careful investigations, trying to determine how many beds are needed for each section of the Common-

wealth, both in cities of 50,000 and over, which are exempted by this resolution, and for communities under 50,000. As a result, we have drafted in a rough form and have submitted to the public health council of the State Health Department, four distinct bills. They provide for different schemes. The public health council is just beginning to take up the consideration of them. Whether they will adopt the features of one bill exclusively or take features from several, or finally redraft a new bill, of course I cannot say. They will do what they think is best under the circumstances. Our object was to get before them all schemes that seemed to be at all feasible.

When we first began this work we were advised to take groups of smaller cities and towns, disregarding any of the county lines. That is theoretically a very fine scheme, but I am convinced that it is practically unworkable.

I drafted a bill of some twenty odd pages trying to get something on paper that would fit this plan, and it is obviously unworkable. I don't believe we could ever get district hospitals along that line. Any bill that is practical utilizes the county unit.

I think there are really just two practical schemes. One is to utilize the county lines, providing of course, for as many institutions as may seem necessary within the county, or in some cases combining counties. In Franklin the local sentiment seems to be a unit that they do not want to build a separate tuberculosis hospital. There seem to be the very best of reasons why they should not build a county tuberculosis hospital, the one best reason being, that the county would not have enough consumptives to run such a hospital on a business-like and economical basis. There is now located just outside the city of Northampton, in the neighboring county of Hampshire, a very complete and well-equipped sanitarium. That sanitarium has not enough call for it from Hampshire County alone to run it on the most economical basis per capita. That sanitarium is as accessible from the portions of Franklin County where probably 80 per cent. of the population is as it is from many portions of Hampshire County, so there would seem to be no good and valid reason why those two counties should not combine. On the other hand, for a county such as Middlesex it would be foolish to combine with another county.

Our minimum estimate is that there are not less than 500 beds needed in Middlesex County, and it is obviously improbable that that county could be served advantageously by any one hospital.

That is about the way the matter rests. I have given more of an explanation than you probably have had before, for the simple reason that we are trying to avoid giving any expression of opinion, because it is so incomplete. Perhaps I have been premature now, because it is really up to the public health council to recommend legislation to the General Court, and they simply have our rough ideas before them for consideration.

MR. BORDEN: I don't want to do anything to prevent small towns from making proper provision. I am wondering if it would take the meat out of the bill if we endorsed a provision for tuberculosis hospitals for towns of less than 50,000.

DOCTOR KELLEY: We cannot do anything else under the language of the resolve. That is precisely what the resolve is.

MR. BORDEN: District hospitals. It is a question who is going to supervise those hospitals. When the bill comes in shape some of you gentlemen representing those towns may be opposed to them, although you will already be on record as being in favor of practically any plan which the public health council endorses. If you put up in general language that you endorse any scheme for the building of hospitals throughout the state, you put yourselves on record as knowing the need of such institutions; but district hospitals mean picking out certain districts and carrying on a hospital in some particular way which is now being evolved, which may or may not be agreeable when you gentlemen know what it is. I hate to oppose any resolution that comes before this Association for the benefit of the public, but I have always felt with a board of this sort that the public relies upon its intelligent action, and that we ought to know what we are voting upon in more or less detail before we put ourselves on record in favor of it.

DOCTOR PALMER: May I ask if it would remove the objection of the last speaker if as an amendment the word "district" were to be changed to "more hospitals?"

MR. BORDEN: Yes, certainly, some language of that sort, because the word "district" fixes it to some particular plan.

The resolution as amended was adopted.

Mr. Robert N. Hoyt presented the following progress report of the committee on standardization of local health regulations:

SECTION ON COMMUNICABLE DISEASES.

I. REPORTING DISEASES.

(1) *Diseases which must be Reported.*

The following diseases have been declared by the State Department of Health to be dangerous to the public health and therefore must be reported to the Board of Health.

Actinomycosis	mation of the eyes
Anthrax	of the newborn)
Anterior Poliomyelitis	(b) Suppurative
(Infantile paralysis)	Conjunctivitis
	(c) Trachoma
Asiatic Cholera	Leprosy
Chicken Pox	Malaria
Diphtheria	Measles
Dog-Bite (Requiring anti-rabic treatment)	Mumps
	Pellagra
Dysentery:—	Plague
(a) Amebic	Rabies (Hydrophobia)
(b) Bacillary	Scarlet Fever
Epidemic Cerebro-Spinal Meningitis	Septic Sore Throat
German Measles	Smallpox
Glanders	Tetanus (Lock jaw)
Hookworm Disease	Trichinosis
Infectious Diseases of the Eye:—	Tuberculosis (all forms)
(a) Ophthalmia Neonatorum (inflammation of the eyes of the newborn)	Typhoid Fever
	Typhus Fever
	Whooping Cough
	Yellow Fever

(2) *Physicians must Report Diseases.*

When a physician knows that a person whom he is called to visit is infected with a disease dangerous to the public health, he shall immediately

give notice thereof in writing over his own signature to the Board of Health.

NOTE.—It is recommended that in all cases of scarlet fever, diphtheria and smallpox and in cases of typhoid fever or septic sore throat when occurring in the household of any person engaged in the production, transportation or handling of milk, or when presumably caused by the consumption of infected milk, the written report shall, when practical, be preceded by an immediate telephone report to the Board of Health.

(3) *Householders must Report Diseases.*

A householder who knows that a person in his family or house is sick with a disease dangerous to the public health shall forthwith give notice thereof to the Board of Health.

II. ISOLATION AND SICK ROOM REGULATIONS.

(4) *Isolation of Infected Persons.*

Whoever is infected with diphtheria, scarlet fever or smallpox shall be isolated to the satisfaction of the Board of Health and no person so infected shall leave the hospital or room designated by the Board of Health until given permission by them.

No person other than the attending physician, clergyman, necessary attendants and agents of the Board of Health shall enter nor shall any dog or cat be allowed to enter any room or apartment set apart for the isolation of a case of diphtheria, scarlet fever or smallpox.

All persons entering the room or apartment where a case of diphtheria, scarlet fever or smallpox is isolated

shall take such precautions and practise such measures of cleansing or disinfection of their persons or garments as shall be prescribed by the Board of Health.

No person shall permit any child, minor or other person under his charge, infected with measles, whooping cough or anterior poliomyelitis to come in contact with others than adult or immune members of the household.

(5) *Disinfection of Articles and Excretions.*

No article shall be removed from the room in which a case of scarlet fever, diphtheria or smallpox is isolated until disinfected as required by the Board of Health.

(6) *Duration of Isolation.*

Isolation and quarantine shall continue until release by the Board of Health.

The minimum period of isolation or quarantine of a person having any of the following diseases (reckoned from the date when the notice of such disease is mailed) shall be as follows:

Diphtheria: until two successive, negative cultures, taken from the site of the disease at least 24 hours apart have been obtained.

Scarlet Fever: 28 days and thereafter until all abnormal discharges have ceased.

Smallpox: until desquamation ceases.
Anterior Poliomyelitis: 28 days.

III. EXPOSED PERSONS.

(7) *Maximum Incubation Periods.*

Persons who have been exposed to diseases dangerous to the public

health shall be deemed to be in danger of contracting such diseases unless immunized by an attack or by vaccines or unless free from symptoms of the disease during the following longest common incubation periods after the latest exposure.

Diphtheria: 8 days.

Scarlet Fever: 8 days.

Smallpox: 21 days.

Anterior Poliomyelitis: 14 days.

Chicken Pox: 21 days.

Measles: 14 days.

Mumps: 21 days.

Whooping Cough: 14 days.

NOTE.—It is recommended that persons who have been exposed to diphtheria, scarlet fever or smallpox be under observation during the above incubation periods.

IV. EXCLUSION FROM SCHOOL.

(8) *Exclusion of Infected Children from School.*

Persons who are or lately have been infected with any disease dangerous to the public health shall be excluded from all schools and gatherings of children during the following periods and until given a permit by the Board of Health:

Anterior Poliomyelitis: 28 days.

Diphtheria: until released from isolation.

Chicken Pox: until skin and mucous membrane lesions heal.

German Measles: 7 days after appearance of the eruption.

Measles: 10 days after appearance of the eruption.

Mumps: 21 days.

Scarlet Fever: 35 days and until all abnormal discharges have ceased.

Smallpox: until desquamation ceases.

Typhoid Fever: until recovery.

Whooping Cough: 21 days and during the paroxysmal stage.

(9) *Exclusion of Exposed Children from School.*

Children who are members of a household where a case of disease dangerous to the public health exists or who have been exposed to such a disease shall be excluded from all schools and gatherings of children during the following incubation periods or until a permit is granted by the Board of Health.

Diphtheria: 8 days.

Measles: 14 days unless immunized by a previous attack.

Scarlet Fever: 8 days.

Smallpox: 21 days unless recently successfully vaccinated.

Whooping Cough: 14 days unless immunized by a previous attack.

V. QUARANTINE OF PREMISES AND HOUSEHOLD.

(10) *Placarding of Dwellings.*

The Board of Health shall give warning of the existence of each of the following diseases by posting a placard bearing the name of the disease near one or more of the entrances to the dwelling, apartment or room in which such case is located.

Anterior Poliomyelitis (Infantile paralysis).

Diphtheria.

Measles.

Scarlet Fever.

Smallpox.

Whooping Cough.

The Board of Health shall give such warning of other diseases dangerous to the public health as shall be necessary for the protection of the public or as shall be required by law.

No person shall, without permission of the Board of Health, remove, obliterate or deface such placard and the responsible head of the household shall immediately notify the Board of Health in the event of the removal, obliteration or defacement of such placard.

(11) *Restrictions for Scarlet Fever, Diphtheria and Smallpox.*

The posting of a placard on a dwelling, apartment or room where a case of scarlet fever, diphtheria or smallpox exists shall impose the following quarantine regulations which shall apply to all portions of the dwelling within the placarded entrances and to persons living therein.

No person in whose dwelling there shall occur a case of scarlet fever, diphtheria or smallpox shall, without the permission of the Board of Health, remove or permit to be removed from the dwelling any clothing or other article which may have been exposed to infection.

No occupant of such a dwelling shall take up residence elsewhere nor enter any public gathering or conveyance without the permission of the Board of Health.

(12) *Restrictions for Measles, Whooping-Cough and Anterior Poliomyelitis.*

The responsible head of the household where a case of measles, whooping-cough or anterior poliomyelitis occurs shall see that children who are not

members of the household are excluded unless known to be immunized by a previous attack of the disease.

(13) *Milk Bottles.*

No milk bottles shall be removed from a house in which there is or has been a case of diphtheria, scarlet fever or typhoid fever without permission of the Board of Health.

(14) *Public Libraries.*

There shall be no interchange of books between libraries and quarantined households.

(15) *Public Funerals Forbidden in Certain Cases.*

No public funerals shall be held of any person who has died of diphtheria, scarlet fever or smallpox.

NOTE.—The purpose of this regulation is to prevent the spread of disease by the living members of the deceased's household who may be convalescent from the disease or who may have the disease in a mild or unrecognized form.

(16) *Exclusion from Business.*

No person shall engage in the handling of milk or food nor in an occupation bringing him into close contact with children after exposure to or while residing in a household in which there is a case of scarlet fever, diphtheria, typhoid fever or smallpox without permission from the Board of Health.

Other persons may be required to remove from the dwelling or to abandon their occupations if the nature of the isolation of the patient or the amount of contact occurring in the occupation are held by the Board of Health to require such action.

VI. TUBERCULOSIS.

(17) *Disposal of Sputum.*

Every person suffering from tuberculosis shall dispose of his sputum in a manner which shall not endanger the public health.

(18) *Notice of Removal.*

Whenever a person with tuberculosis changes his residence, the attending physician, if there be one, or the active head of the household in which the patient resides forthwith shall notify the Board of Health of the change and both of the above mentioned persons shall be held legally responsible for the violation of this order.

COMMITTEE ON STANDARD LOCAL HEALTH REGULATIONS.

CLARENCE J. ALLEN, M. D., Winchester.

JOHN A. COOK, Provincetown.

EDGAR GUILD, M. D., Springfield.

FREDERIC W. HOWE, Framingham.

L. A. JONES, M. D., State Health Officer.

FRANK W. JACKSON, Brockton.

GEORGE T. LENNON, Haverhill.

DAVID J. O'CONNELL, Esq., North Easton.

ROBERT N. HOYT, Wellesley, Chairman.

It was voted that the report be laid on the table until the next meeting for discussion. Dr. F. P. Denny presented the following report for the Committee on Incurrible Consumptives:

DOCTOR DENNY: In compliance with the vote of the Association last October the com-

mittee prepared a draft of two bills which have been submitted to the Legislature, and I think a copy of these bills has been sent to all members of this Association. One bill, 322, provides that authority be given for the commitment of any tuberculosis patient to a hospital, and also the transference from a tuberculosis hospital to a special institution of the state if he does not follow the rules and regulations of the hospital. Unfortunately, the two bills got separated in the Legislature, and a hearing was given this morning on bill 323, which provides for the erection of a hospital for the incurrible consumptive by the trustees of hospitals for consumptives. The legislative committee agreed to continue the hearing on this bill until bill 322 was to be taken up, because they obviously should be considered together. Our committee hopes that when House Bill 322 comes up for consideration as many members of this society as possible will be present, and especially that they will bring to the committee instances of difficulties that the different boards of health have had in controlling the incurrible consumptive. Mr. Stone is also very anxious to know of instances where city solicitors have expressed the opinion that there was not at present sufficient power given boards of health to commit consumptives to hospitals, and he would be very glad if anyone would tell him or tell any member of the committee of instances where any expression of opinion had been given that the boards of health have not sufficient power at present.

It was voted that the report be accepted as progressive.

A symposium on Influenza and Pneumonia was then presented. (This symposium is printed elsewhere in this issue of the JOURNAL.)

Book Reviews.

Educational Hygiene. Edited by Louis W. Rapeer, Ph. D. New York: Charles Scribner's Sons, 1915. Cloth, 8 vo. Pp. XIX+ 650, 104 ills., bibliography. Price, \$2.50.

This work is designed to bring together, in one organized and comprehensive volume, the latest information and advice of specialists in all the large phases of its subject. In scope and dimensions it illustrates strikingly the expansion and specialization in this distinct field of the great subject of hygiene. In thirty-three chapters it runs the gamut through the five divisions of medical supervision, physical education, school sanitation, the teaching of hygiene, and the hygiene of instruction. This scope carries the work beyond the limits of "school hygiene" as commonly understood and makes it practically a hygiene of childhood from the point where infant hygiene leaves off,—as the subtitle indicates, "from the pre-school period to the university." Just as a broader conception of Health Department administration has reached out to include matters formerly neglected or relegated to personal hygiene, so the larger educational hygiene has ramified beyond the arbitrary limits of the school.

In its almost encyclopedic dimensions the work contains chapters variously of interest to school administrators, teachers, medical inspectors, school nurses, health officers, and parents. The book is not, however, merely a reference book in form or style; rather is it a collection of correlated monographs on separate phases, averaging a score of pages each. The readability of the whole is much enhanced by the typographical scheme and the many examples, diagrams, and photographic illustrations.

The broad conception which governed the synthesis of the work is indicated by the title of Part One,—“Health Sociology.” It is worth while dwelling somewhat on this part in order to indicate the basis and viewpoint of the whole. The opening chapter, by the editor, on “Public Health and the Public Schools” covers a wider ground than the title would suggest and is, in fact, a condensed but interesting treatment of the general public health problem, with an admirable statistical survey and some emphasis on recent tendencies, such as “socialization,” and education through publicity. In this chapter, which concludes with the school

health problem, the following significant summary occurs: “The problem of health is one of the most serious that the country faces. The conservation of our natural resources, such as soils, minerals, forests, and water-power, is a mere bagatelle compared with the problem of the conservation of our human resources. Of these we are criminally wasteful. While we are making some headway in the control of typhoid, smallpox, tuberculosis, the diseases of infancy, and others, there has arisen in recent years an increasing number of degenerative diseases in middle life due largely to ignorance of personal hygiene. Such increases tend to keep the death-rate as high as it has been in the past.”

Chapter II continues the theme of the first, going more specifically into the phases of the public health movement. The author quotes the remark of Professor Sedgwick that the public health movement is going almost too fast for wisdom, and calls for the consolidation of sanitary science and the direction of money and efforts into the really most effective channels. Concentrated sections are devoted to typhoid fever, infant mortality, school medical supervision, communicable diseases of childhood, vital statistics, and other leading topics. It is curious that emphasis is laid on whooping cough as an important cause of death while no mention is made of measles, of the same category of importance. The author believes that the chief problems, in general, are education, concentration, and coöperation, and points out the smallness of health appropriations, but omits to stress organization and the necessity for better training for public health service—equally important and certainly more concrete objects.

Heredity and the home hygiene of children take an important place in this part of the book, which closes with chapters on “Public Coöperation for School-Health Agencies” and the functions of the social center. The former of these last deals largely with various kinds of unofficial but quasi-public organizations and with publicity. The inexperienced would avoid

confusion by leaving the possibilities covered in this chapter until they have mastered the substance of other parts of the book. On page 89 occurs an instance of inaccuracy in publicity for a good purpose, where is cited an argument for dustless cleaning based on the supposed importance of dust as a germ-carrier;—an unintended illustration of the necessity for tuning enthusiasm to scientific fact.

Part Two deals with "The Administration of Educational Hygiene," while Part Three, which constitutes two thirds of the volume, goes into the divisions and practice of the general subject under the heads of "Medical Supervision of Schools," "School Sanitation," "Physical Education," "The Teaching of Hygiene," and "The Hygiene of Instruction." It is quite impossible in a short space to attempt to do justice to the various chapters under these heads,—such excellent ones, for instance, as those on standardization of school medical service, the school nurse and her work, public school clinics, and open-air and open-window schools. In view of the dangers and deficiencies to be avoided in rural schools, the chapter on their sanitation is most appropriate. The teaching of hygiene

in elementary schools is treated with practical effectiveness, all traces of old ideas of the subject as one of mere text-book knowledge being swept away to make room for the modern method of direct application. The foundations of industrial hygiene are concerned in a chapter dealing with vocational education. Part Four is brief, dealing in two chapters with the hygiene of the college.

The relation between health and school progress is outlined in an appendix. A valuable chart summarizing the communicable diseases of children and giving rules for isolation and school exclusion is also appended. The index is short, but the need for it is much diminished by the convenient internal arrangement of the book.

The effort of the editor to restrict the volume to "minimum essentials" has been accompanied by special attention to references and an excellent guide bibliography of books, reports, and periodical sources. Altogether this work should do much to solidify and organize the movement of educational hygiene and should take a conspicuous place as an invaluable comprehensive survey of the subject.

J. Scott MacNutt.

Sanitation in Panama. *Author William Crawford Gorgas, Surgeon-General, U. S. A. Cloth 7½ x 5 inches; 298 pages, 15 illustrations. D. Appleton & Co., New York. \$2.00.*

The story of the Sanitation in Panama, as told by General Gorgas himself in his new book, is one of the most unusual and fascinating in all the annals of scientific achievement. The many interesting accounts of the early history of Havana and Panama reads like a romance. While it is written as a narrative, it is, nevertheless, thoroughly scientific and orderly in arrangement.

The manner in which General Gorgas tells of the early studies of yellow fever at Havana, and the most interesting relationship which existed between Doctor Finlay, the Army Board and himself, brings out many beautiful characteristics of these men.

While reading the book one is very much impressed with the great modesty of General Gorgas concerning his own work, and the care which he takes to give credit to those who preceded him, especially those who established the theory of the transmission of yellow fever by the mosquito. We who have had the great pleasure,

as well as the honor to serve with General Gorgas, know how kind and unselfish he always is in regard to giving credit where credit is due.

The author touches very lightly upon the opposition that he encountered with some of the officials during the early days of the work. But it is not necessary to think of those things now, as he has so wonderfully won out in his great work, which more than repays him for his many trials and much labor.

The last chapter brings the book to a close by describing some of the work done in Panama, and summarizing the results of the Sanitation of the Tropics,—what these results mean to civilization as a whole, and especially to the white race,—the possible changes that will come about, as to the centers of civilization. This makes one believe that the sanitary phase of the Canal work will be considered far more important than the actual construction of the Canal itself, as the years go by.

James Ten-Broeck Bowles.

Ten Sex Talks to Boys (10 and older); Ten Sex Talks to Girls (14 and older). By Irving Davids Steinhardt, M. D. Philadelphia: Lippincott, 1914. \$1.00 each.

Doctor Steinhardt has given in these two books what he himself calls "talks" as they were originally planned for audiences of girls and boys. Both books are written in plain, simple language, frequently, however, not adapted to the needs or understanding of boys of ten and girls of fourteen. In fact, the greatest fault in these books lies in the author's attempt to cover too wide a range. The author should have published at least six separate books instead of two. Few of us would feel it advisable to put in the hands of boys or girls from 10 to 14 books dealing so extensively with the sex problems.

Doctor Steinhardt begins by presenting the detailed anatomy and physiology of the sex organs, illustrated not by diagrams, but by detailed drawings from nature. There follows the hygiene of adolescence, with an extended discussion of constipation and masturbation, admonishing the young people of the bad effects of masturbation, by stating that it "will cause a breakdown of the nervous system, and cause you to end your days in a mad-house, or send you to an early grave." Such statements are calculated to terrorize unnecessarily, without offering the young people any real help in breaking the bad habit.

Venereal diseases are referred to as "the most loathsome of all human ills that leave disgrace and suffering in their wake; diseases that can blight a person's life from the very minute of coming into the world until the leaving of it; diseases that may cause life-long suffering, and insanity; diseases that in their ravages affect the innocent just as severely as the guilty." The chapter on these diseases gives the "loathsome" details of syphilis even to its advanced later manifestations. As though this were not terrifying enough for our children, the author "makes a pathetic address to an unhappy little syphilitic baby." Still this is not harrowing enough, and the young people are shown a picture of a syphilitic baby which I am altogether sure never will be forgotten, making the doctor's admonition "don't let these talks make merely a temporary impression upon you" quite unnecessary.

Following this, Doctor Steinhardt gives us a

talk on sex ethics, emphasizing kissing, dressing, "bartering of sexual organs," dancing, flirting, etc. Much of this contains excellent advice for both boys and girls. Marriage is the next theme touched upon, both its dangers and its advantages. The author emphasizes the qualities which both boys and girls should look for in each other, even discussing at some length "the sexual relation in married life." He says:—

"Wives and husbands both have certain sexual rights which should be perfectly understood. Differences in sexual appetite must be adjusted to make a perfect union. A non-passionate wife, married to a very passionate husband, or the reverse, is liable to cause dissension, unless care and diplomacy are exercised by both. I advise moderation for the sake of their own health and happiness, and for the benefit of any offspring."

In a later talk the author deals with wifehood and motherhood, discussing the signs of pregnancy, the peculiar mental conditions of child-bearing women, and the necessity for medical attention. The doctor decides to "skip an interval—that of the birth of the child and what goes with it—and take up child-management." The closing talk deals with the signs of approaching menopause, with the various symptoms and necessary precautions.

When we think of the girl or boy of ten or fourteen reading all this, reading it alone, without the guiding wisdom of a parent or the sincere doctor himself, we are forced to the belief that Doctor Steinhardt has approached this subject with the attitude of the physician who is accustomed to consider the subject of sex enlightenment from the medical standpoint. What seems perfectly commonplace to him shocks inexperienced youth, and cannot fail to repel the experienced adult who, while accepting physical truths, still holds fast to the spiritual ideal.

These books contain much good material for parents, but they should not be placed in the hands of young people for whom the author states they are planned.

Bertha Chapman Cady.

Health Department Reports and Notes.

REPORTS.

East Orange, New Jersey.

The group of contiguous municipalities embracing Orange, East, West, and South Orange, New Jersey, are of constant interest both for their individual progress and for the fact that, in spite of obstacles, they have managed to organize coöperation in dealing with certain of their common sanitary problems.

The present report is the first from East Orange since the reorganization of its health department in July, 1915; when the present health officer, Mr. John Hall, assumed charge. Mr. Hall exercises admirable selection in presenting data of interest to the intelligent citizen and to other departments, while omitting details of value only to the health department itself. The result is a clear, brief, well-balanced presentation of the salient points in the local situation and work of this city of 41,000. Beyond essential general figures, facts, statistical or verbal, are limited to those diseases and problems of greatest importance. This is a mode of procedure which might well be generally adopted in the reports of towns and small cities: to avoid statistical analyses which are proper only to large masses of data, to free the pages from insignificant routine detail, and to concentrate on bringing out in clear relief the salient local problems and results. Such a method simplifies, unifies, and renders impressive.

The health officer has followed the New Jersey Standard Plan for health reports, but has at the same time preserved his individual mode of treatment,—a demonstration of the fact that such a plan may be usefully applied without producing the perfunctory uniformity that some followers of peculiar local methods have argued against it. At the same time the report is an indication that any standard scheme should distinguish between the minimum substance essential to every local report and those details which cannot be uniformly prescribed.

A passage of more than local interest relates to two epidemics of scarlet fever in the Orange municipalities in successive years, involving respectively 33 and 56 cases, traced to milk supplies. "Both of these supplies," says Health Officer Hall, "were of good standing as far as

sanitary dairies and bacteria counts were concerned, but it is impossible to avoid occurrences of this kind by any known system of dairy inspection of milk analysis. What was the ultimate remedy in these two epidemics could have been their prevention, *i. e.*, pasteurization."

Greater expedition in the handling of nuisances will appeal to health officers who desire to place stress on matters having less esthetic and more sanitary import. The idea of transferring certain duties in this line to the police is not new, but reports on its progress in application are none too many. Of the readjustment being worked out in East Orange, the health officer says:—"This will probably consist of giving one of the Health Department inspectors the authority of a special policeman and several police officers the title of Deputy Sanitary Inspectors, with the power to abate nuisances in the form of dirty yards, improperly cared-for refuse and the like. This plan will conserve for the Health Department a great deal of time spent on matters with a very remote relation to health, will give the individual policemen on their beats only a small amount of extra work and, in all, should add a great deal to the cleanliness and decency of the city."

The report closes with the following strikingly optimistic remarks on the development and extension of prevention:—"In cities of a high grade of municipal development the really vital health problems are changing, and the mortality statistics show the great amount of sickness and death is due to the diseases with which health authorities have heretofore had little to do. The actual public machinery of disease prevention is being developed nearly to its natural limit, and only with a great deal of private effort can improvement go on. Water supplies and sewerage systems are generally used, and in the up-to-date cities, give good service; milk will be pasteurized within a relatively short time; communicable diseases are on the decrease, and epidemics are quickly put under control. The six diseases causing 60 per cent. of the deaths are preventable, or at least postponable, but only by private effort. Cancer

can frequently be cured by timely operation; the organic heart diseases, apoplexy, Bright's disease and tuberculosis may be avoided by right methods of living; pneumonia need not have its great toll of deaths, if the rules of personal hygiene are closely followed, particularly during the winter months. The secret of health

and life, especially in the ages above 40, is periodic medical examination to discover the beginning of these disorders, so that they may be remedied before it is too late. The great duty of the Health Departments is to impress these facts upon their people and, if this is done, results will be sure to follow."

Jackson, Michigan.

Another of the earliest reports for 1915 to appear is that of Jackson, Michigan, a city of 35,000, which has recently adopted commission government under the city manager system. That this change has worked for the improvement of the Health Department through reorganization appears from the report of Dr. C. G. Parnall, the health officer. From the executive down to the liberal number of four public health nurses the city evidently has the basic organization for the best of work. "Although the work of the department this year has been entirely reorganized and extended in scope, with the employment of full time officers and employees," writes the health officer, "these changes have been effected without increased cost to the taxpayers." One may well judge that the 24 cents per capita per year spent in Jackson on the public health is economically and effectively applied.

The health officer discusses briefly and interestingly subjects ranging widely from vital statistics to public comfort. Terminal fumigation has been largely discontinued and the emphasis placed on disinfection of discharges and proper sickroom sanitation under the supervision of the nursing service. Under the head of nuisances he proposes that efficiency would be promoted if all public patrolmen acted as sanitary inspectors. The report closes with a strik-

ing summary under three heads: "Results Accomplished," "Shortcomings," and "Needs";—a feature which adds distinctly to the readability and "snap" of the report.

Without detracting from the good impression produced by the report, it should be suggested that the presentation of vital statistics be somewhat revised. There is observable among health reports in general a strange reluctance to adopt the straight International Classification of causes of death; the present report for some not evident reason uses the international numbered titles, but arranges them alphabetically. Deaths and cases are analyzed to a plethora of columns by month, age, etc., while, on the other hand, one does not find death-rates for the chief causes. Scores for dairy farms are given individually, but one looks in vain for the bacteriological counts of the various supplies, an index of far greater value. Such long lists of ratings in any case emphasize the need for some system of grading or grouping. Some statement of the Health Department's prosecutions might well be given, unless the Jackson authorities occupy the Utopian position of needing to use only persuasion in the course of duty,—a situation which might readily be understood could all the citizens be brought to read this convincing report.

United Fruit Company Medical Department.

In some parts of the world—many of them tropical or otherwise presented special health problems—the health of the inhabitants depends to a large degree upon private concerns which assume many of the functions of public authority. Hence such a document as the present, which covers the medical and sanitary work of the United Fruit Company for the year ending September 30, 1915, well deserves a place among public health reports.

Some idea of the extent of this work is conveyed in the grand total of patients furnished treatment by the company's physicians in hospitals, dispensaries, and steamships, 116,461,—the average number of employees and others dependent on the company for medical service being 50,562. This furnishes the basis for a very considerable experience in tropical medicine and sanitation.

The report consists mainly of detailed sta-

tistical tables for seven separate districts and for employees and passengers carried on steamships. There is no general discussion, but from the brief letters of transmittal of the division superintendents may be gleaned some interesting items relating to sanitation, quarantine, anti-mosquito work, and the combating of hookworm and other tropical and semi-tropical diseases. Some of the work is experimental, as, *e. g.*, on treatment of intestinal parasites.

Of interest are the results of complete phys-

ical examinations of one hundred employees, picked indiscriminately from the better class, as follows: 32 per cent. had defective vision; 1 per cent. defective hearing; 3 per cent. heart lesions; 4 per cent. suffered from diseases of the respiratory system; 3 per cent. from nephritis; 33 per cent. showed glandular enlargement; 8 per cent. gave positive Wassermanns; 2 per cent. gonorrhoea; average age, 33.2 years.

Noteworthy work against rats and other vermin is mentioned, especially in connection with the steamships.

NOTES.

Typhoid Fever Reduction in New York City.—

In the *Weekly Bulletin* of April 1 of the New York City Health Department, attention is called to the control of typhoid in that city as shown by the enormous reduction effected within the past ten years. During that time the typhoid fever death-rate per 100,000 population has been decreased from 14.78 (average 1905-09) to 6.0 for 1914. Thus among the cities in the United States of over 500,000, New York stands first in its control of typhoid fever with Boston and Chicago second and third. The larger European cities, for the most part, have lower death-rates, though the reduction of the rate in New York during the last few years has progressed at a rate equal to that of any other city in the world.

That the control of typhoid fever in this city is effective, is well evidenced. Every case of this disease reported to the Health Department is visited by an inspector who makes careful inquiries into the history of the case and records the facts elicited on a special history card. These cards are then analyzed by the Chief of the Division of Epidemiology. Below is an analysis which shows the result of such epidemiological investigations during 1915. For comparison the figures for 1905 are also given.

Source.	1915.	1905.
Out-of-town	372	535
Direct exposure	165	225
Milk	112*	525†
Food contaminated by flies carrying typhoid infection .	95	

* Milk contaminated after pasteurization, by infected well water used at the creamery.

† Raw milk.

Source.	1915.	1905.
Carriers.....	118	
Watermelons floating in polluted harbor water.....	12	
Oysters.....		124
Water.....		864
	874	2,273
Unknown.....	1,582	1,312
	2,456	3,585

In respect to certain features of this analysis, the following explanation is taken from the bulletin:

"This analysis supports the contention repeatedly made by Bolduan that up to now the typhoid fever of most large cities in this country has been very largely rural, *i. e.*, extra-urban, in origin. In the above analysis, taking the 1915 figures, we should add the 372 out-of-town infections to the 112 infections due to milk infected at a creamery, a total of 486 cases of rural origin out of 874 cases whose origin was definitely traced, or at least 20 per cent. of the 2,456 cases reported. Taking the 1905 figures, we should add the 535 out-of-town infections, the 525 cases infected from milk, and the 864 cases infected from water, a total of 1,924 cases of rural origin out of 3,585 cases reported, *i. e.*, more than 50 per cent. In this city, therefore, an enormous reduction of typhoid fever of rural origin has occurred, and this is undoubtedly due to

(a) the effective chlorination of all the Croton water.

(b) the effective pasteurization of the milk supply.

The lesson taught by these figures is clear, and may well be studied by other American cities which desire to deal effectively with typhoid fever—the national disgrace.”

*

Half a Century of Health Work.—The *Survey* of March 18, 1916, draws attention to the fiftieth anniversary of the organization of the New York Health Department. It draws an inspiring picture of fifty years of remarkable progress.

“On March 5, 1866, the department was organized on a new basis. Eight years earlier, on the recommendation of a citizens’ committee the state had provided for a special investigation of conditions in the city and necessary legislation for their improvement. The report of this special committee was a platform upon whose substantial planks the progress and success of the department has been for half a century a-building.

For the next ten or fifteen years the department was concerned chiefly with sanitary matters. But in 1866–1867 a few cases of cholera and yellow fever focused attention on disinfectants and established the value of carbolic acid and sulphur. In its second annual report the board drew attention to the prevalence of venereal disease and out of this recognition grew the present bureau to control venereal disease. In 1886 the “summer corps work” was started and developed into the excellent system now known as the Bureau of Child Hygiene. In 1897 the board turned its attention to milk, and periodical inspections were made of milk stores, creameries, and dairies.

“The department’s progress through later years in publicity and public health education, the important researches of its Bureau of Industrial Hygiene, the significant beginnings of health center work, and its high degree of freedom from political complications, are too well known to need reiteration at this time. To the efficiency and public spirit of the leaders from Parker to Biggs and Goldwater and Emerson, as well as to the skill and coöperation of its staff, New York owes a large obligation which it may well recognize at this semi-centennial anniversary by plans for immediate extension of work so well begun.”

Our Babies—How to Keep Them Well.—The *Illinois Health News* for March is given over entirely to the babies and tells in an extremely interesting way how to “keep the babies well and happy.” The little pamphlet abounds in happy phrases scattered here and there, a few of which are given below:

“The beginning of life saving should be at the beginning of life. Prevention of disease for later life doesn’t mean much to the baby that has been permitted to die in infancy.

“The baby is the only animal than can actually be benefited by an authentic pedigree. Pups and colts will never know whether they are registered or not.

“The dial of the scales is the Dun or Bradstreet of the baby’s career.

“Among the few things unforgivable is the unwillingness of the mother to nurse her child.

“Babies do not want silks and satins; but they do want sunlight and sanitation.

“A baby wants warmth, cleanliness and comfort. He isn’t interested in mahogany or in polished brass.”

*

Boston Association for the Relief and Control of Tuberculosis.—The twelfth annual report of this organization is an interesting example of what aid such a private association can be to the health department in combating this dread disease. The association was organized in 1903 and since then has been doing excellent work in many directions. Illustrative of this is the fact that the association

1. Has helped in reducing the death-rate from tuberculosis in Boston from 23 + per 10,000 inhabitants in 1903 to 17 + in 1914.

2. Supported a nurse to examine and report on the home conditions of cases of consumption, and to give advice and instruction to patients and their families, both at home and at the State Sanatorium examining clinic.

3. Founded and operated for three seasons, under a special fund, the first American Day Camp Sanatorium for Consumptives.

4. Instituted a special investigation and physical examination of children in the families of those who have tuberculosis.

5. Maintains traveling educational exhibits, illustrating methods of prevention and cure of

the disease, and the importance of cleanness to the general health.

6. Presented to the Legislature of 1911 six bills, four of which became laws.

7. Has organized a special committee on Health in Industry with a paid secretary. This committee interests mercantile and manufacturing concerns in the conservation of the health of employees.

8. Supported a Domestic Science Visitor to instruct families afflicted with tuberculosis in the proper selection and preparation of food.

9. Has issued "Friendly Advice for Consumptives" (English, French, Italian, and Yiddish), "A War upon Consumption," "Protection of Health from Tuberculosis" (English and Italian), "Out-door Schools," and other circulars for popular distribution.

Public Health Notes.

The Conquest of Typhus Fever.—The splendid work of the American Commission under Dr. R. P. Strong in stamping out typhus fever in Serbia is the subject for editorial comment in *American Medicine* for February 1916.

"From the time of the plague in Athens in the fifth century B. C., it has ravaged many lands and influenced the destiny of nations. Particularly has it been the ally of Mars and fought along with powder and shot for the desolation of mankind and the ruination of states."

The writer then goes on to trace the history of the disease down to the isolation of the organism in 1915 by Plotz, and the important part played by American investigators.

"The entire story of prevention of typhus fever may be summed up as the maintenance of cleanliness. Plenty of water and soap, the disinfection of clothing, the application of kerosene oil together with general sanitation will not merely clear up an epidemic of typhus fever, but will prevent its occurrence.

* * * * *

"The main lesson learned from the activities of the United States Commission in Serbia is that the war against typhus fever is reduced to a problem in economic entomology. As the antiplague campaign has resulted in a fight against rodents and their accompanying fleas, so typhus prevention has been concentrated in the elimination of the *pediculus vestimenti* and *pediculus capitis*."

*

Intensive Community Health Work.—One frequently meets in public health work people "from Missouri," who must be shown results before they lend their support to the health authorities. This class of people is most fre-

quently won over by intensive community health work. Dr. John A. Ferrell, writing in the *Southern Medical Journal*, March, points out that this intensive work affords an opportunity "to go out and definitely prove to the satisfaction of the average man the claims for preventive medicine that have been made by the health officer and his assistants in pamphlets, newspaper articles, addresses, etc. It establishes interest and confidence in the lay mind, which results in the local appropriation of funds for extending intensive community health work.

"Intensive community health work differs from ordinary health work, in that a concrete health problem is taken and adhered to until measurable progress has been made. It is limited to a relatively small circumscribed area or areas instead of being diffused throughout a large area such as a state or a county. A detailed record or a survey is made of the area selected, including every house, school, church, road and stream, and usually, this information is shown on a map. Every home is visited and inspected and every person is examined as far as practicable with reference to the particular health problem under consideration."

He describes the work conducted by six of the states in the South and directed to the prevention and cure of hookworm disease and concludes that this community system is "practicable, that it brings definite and convincing results, and that its cost is not beyond the means of the people. It thus affords an opportunity to advance public health work on the basis of concrete demonstrations just as farming has been revolutionized by the concrete demonstration."

A New Type of Open Air School.—The *London Medical Officer* for March 4, 1916, offers an interesting solution of the very difficult problem of open air school architecture. This plan is by G. H. Widdows, and illustrates some new departures in heating, lighting, and ventilation. The plan has been tried out during the winter months and the notes are based on actual results.

"The special lighting of this school is by means of a skylight the whole length of the classrooms and 5 feet deep, inclined at an angle of 60 degrees with the horizontal. The light received through this skylight is evenly distributed and full, and, coming from above the level of the eyes, gives to the classroom a very restful appearance.

"The heating was a new departure, suggested by the school medical officer, and consists of low-pressure steam pipes in trenches under a concrete floor. It was the subject of thought for two years. It has been found that the floor surface need not be more than 75° F. This temperature is not sufficient to cause inconvenience to the feet. With an outside temperature of 38° F. with the top half of the door down on one side and the hoppers open on the other, it has been found that a floor temperature of 79° F. gives a temperature of 59° F. 1 foot from the floor, and 57° 6 feet from the floor. The great feature of the floor heating is the uniformity of temperature obtained whatever the outside temperature.

"As regards ventilation, this school is far in advance of anything so far attempted in this country. The two sides consist of folding doors opening out under covered verandahs. It is therefore possible to have one or both sides open; not only so, but the doors are made so that the top half drops down, and half one or both sides can be open. Should wind and weather be very unpropitious the top halves of the doors can be made to fall open a distance of 4 inches and act as hoppers. It will thus be seen that it is possible on both sides to have the doors wide open, half open, or partly open as hoppers."



The Standardization of Disinfectants.—An elaborate and critical comparison of the Hygienic Laboratory and the Rideal-Walker tests, by J. T. Ainslie Walker, appears in the *New York Medical Journal* for March 11, 1916. This is

doubly interesting in view of the fact that the European conflict has aroused widespread interest in the subject of disinfection and the prime need of determining the germicidal efficiency of disinfectants.

Six elements are enumerated which the author believes should be found in a reliable test for the standardization of disinfectants. Each of these is discussed in great detail and the following defects in the Hygienic Laboratory method pointed out:

"1, The variable phenol control; 2, the inconsistent resistance of the test organism; 3, the use of an arbitrary mean between two abnormal extremes for ascertaining a fictitious coefficient; 4, the complicated technic; 5, the open pots which preclude thorough mixing and also permit contamination; 6, the impossibility of obtaining concordant results by different workers."

From the foregoing he concludes that "instead of being an improvement upon the standard Rideal-Walker test, the so-called hygienic laboratory method is so defective as to be wholly unreliable and incapable of furnishing results of any scientific or practical value whatever."



Relative Prevalence of Tuberculosis Under Good and Bad Housing Conditions.—There is food for thought in the article on this vital question in the March number of the *Journal of the Outdoor Life* by Dr. Charles J. Hastings, Health Officer, Toronto, Ont. He reminds us that:

"In considering the problem of greater prevalence of tuberculosis under bad housing conditions, we have to deal in many cases with cause and effect. Whether disease, by adding to the family expenditure and by diminishing the wage-earning power, leaves less money available for rent and thus brings about the overcrowding; or whether, on the other hand, overcrowding is associated with some other conditions or conditions which are favorable to disease, are questions of vital importance in this connection.

"We naturally ask ourselves then, how much of the misery in our back streets is due to one thing and how much to another? How much is due to worry? How much to dark, dusty factories? How much to improper clothing? How much to improper, insufficient, or badly cooked food? How much to general malnutrition?

How much to overcrowding? How much to unsanitary privy pits? How much to drunkenness and dissipation?

"In the report made by the Social Survey of the Cincinnati Anti-Tuberculosis League, the conclusion arrived at was that dissipation must take the lead as the causes of increased tuberculosis in these districts.

"Have we not taken too much for granted in the deductions we have made in the past in our investigations, and has not the time now come in the march of social progress when we must be more specific and debit to the various items of our list of social ills, the proportion of maladjustment due to each?

"While I do not wish for a moment to underestimate the significance of good housing conditions, yet I wish strongly to urge the necessity of a more careful analysis of the various causes of the greater prevalence of tuberculosis under bad housing conditions."



Community Sickness Surveys.—An interesting report on this new effort in Public Health work appears in the *U. S. Public Health Reports* for February 26, 1916. The investigation was carried on by Lee K. Frankel, Ph. D., sixth vice-president, and Louis I. Dublin, Ph. D., statistician, Metropolitan Life Insurance Co., New York. The work was prompted by the fact that:

"An unemployment survey made by the Metropolitan Life Insurance Co. in conjunction with the Bureau of Labor Statistics of the Federal Government, during 1915, and covering over a million wage-earners in selected cities of the United States, developed the interesting fact that 11 per cent. of the unemployment was caused by sickness or accident disability. Over 1 per cent. (1.2) of all the wage-earners canvassed were unemployed on account of illness. The figure varied somewhat from city to city. The maximum was in Duluth, where 2.4 per cent. of all wage-earners were unemployed because of illness; the minimum was in Milwaukee, where 0.8 per cent. were so unemployed.

"These facts, together with a desire to measure approximately the amount of illness prevailing in American communities, have led the executives of the Metropolitan Life Insurance Co. to institute a plan to determine the amount

of sickness, similar to that utilized in surveying unemployment. As in the latter investigation, the company availed itself of the services of its field organization, and the city of Rochester was chosen as the community in which the initial survey was to be undertaken."

The problem was attacked from many sides. Extent of disability, sickness by sex and age, duration of sickness, economic loss from sickness, comparison with other communities' enumeration of sickness were each in turn determined.

"Of the persons unable to work, 220, or 27.6 per cent. of the total cases, were confined to bed, that is, either at home or in a hospital. It is interesting to observe that 10.7 per cent. of all the cases were receiving hospital treatment. On the other hand, 441 cases, or 55.2 per cent., were unable to work but were, nevertheless, up and about.

"The rates for total sickness varied sharply by age periods. Among males, the highest rate occurred in the age period 65 and over; the least for the group of ages under 15. The same age periods exhibit the greatest and least amount of sickness for the females. Since our study is concerned essentially with sickness involving incapacity to work, the following observations will apply solely to that class of cases. The rates of sickness among females incurring disability were distinctly higher than for males for all ages up to 54. From age 55 onward the male sickness rate exceeds that of the females.

"The durations of the several illnesses to the date of inquiry were also ascertained. Of the 661 persons unable to work, 8 were incapacitated one day, 41, or 6.2 per cent. were incapacitated less than one week. Among those sick and unable to work, 149, or 22.5 per cent., were incapacitated less than one month. On the other hand, persons able to work showed a smaller proportion of the cases under one month in duration. Rheumatism, neuralgia, neuritis, neurasthenia, and headache, which constitute the bulk of the cases sick and unable to work, were for the most part longer than one month in duration, and therefore influence the figures for the entire group. A considerable number of the cases were of long duration; thus, 128, or 19.4 per cent., were between one year and three years. Of the cases with disability, 177 cases, or 26.8 per cent., lasted over three years.

"The duration of the illnesses of those sick but able to work was chiefly for long periods. Seventy-eight out of 137 cases of sickness not involving incapacity to work, or 56.9 per cent., were one year or more in length.

"Rheumatism, diseases of the nervous system, organic diseases of the heart, and Bright's disease were responsible for a large part of illnesses over one year for those sick but able to work.

"The estimated male population of Rochester 15 years of age and over for the year 1915 is 92,552. On the basis of the above sickness rates we may conclude that there are throughout the year at least 2,147 males constantly sick. This means approximately 644,000 days of disability for males alone, for we may count on 300 working days per year per individual. At an average daily wage of \$2, the wage loss alone for a year in a city like Rochester would be \$1,288,000, and this figure, we have observed, is a minimum. It does not include cost of medical care, drugs, nursing, etc. The number of females in Rochester 15 years of age and over in the same year is estimated to be 93,392, which, at the rate of sickness found, would give 2,400 cases of sickness continuing throughout the year. The economic loss sustained through this disability of the females is doubly difficult to estimate, because of the uncertainty of the number engaged in gainful occupations.

"Sickness surveys made in conjunction with the decennial censuses of the federal government should prove most helpful. In like manner, the statistics of hospitals, of visiting nurse associations, and of institutions for the care of the blind, the crippled, and the insane should be collected and analyzed. It is only through the coördination of such sources that the total cost of sickness and accident disability in the community will be ascertained and proper measures organized for its control. The life conservation movement of today, as a basis for a constructive program, has a deep need for a scientific and accurate measure of sickness and of its effects."

The Health Center Idea: A New Development in Public Health Work.—The interesting question, "How shall health services be broadened so as to reach the whole population of the town, ward, city, or street?" is answered by Michael M. Davis in the January number of the *Public Health Nurse Quarterly*. He traces the development of the health center throughout the country, discussing in detail the work at Pittsburgh, Cincinnati, Philadelphia, New York, Cleveland, Dayton, Boston, Buffalo, and many other communities.

"The health center illustrates two fundamental principles, namely, a definite area and population is selected for the field of operation; second, it is aimed to extend the services provided to the whole population.

"The health center idea means doing things for everybody, and doing things together, within a given district. More specifically, it is public health work which involves

1. A population unit, *i. e.*,
 - (a) The area and population covered is defined;
 - (b) The aim is to reach all the population so far as the health services offered apply.
 - (c) The results are measured by the 100 per cent. test, that is, not the number of persons reached effectively, but the proportion of the population which is reached effectively.
2. The coördination of local effort, especially,
 - (a) Of the medical and sanitary services within the district;
 - (b) Of the nursing services, involving correlation or combination of various nursing specialties;
 - (c) Of social services, involving correlation or combination of neighborhood forces, and of the social agencies at work in the neighborhood.
3. A local administrative unit, involving,
 - (a) A local administrative head;
 - (b) Supervision of all special services by specialists working administratively through the local head."

Industrial Hygiene and Sanitation.

Industrial Medical Supervision.—Large industrial concerns are beginning to adopt medical supervision, both as an economic measure as it affects the employers, and in the interest of the employees. A pamphlet issued by the Eastman Kodak Company contains the address of its medical officer, Dr. Guy L. Howe, to the Rochester Chamber of Commerce. He describes the plan of organization of the medical work and some of the results. The work is divided into physical examination, care of accidents, care of sickness, sanitary inspection and health publicity. Every applicant for work who qualifies, by his own consent, undergoes a physical examination to determine his fitness for the work he expects to do. This examination includes a study of the heart and lungs, a test of the eyes for astigmatism, colorblindness and near and far vision, and a test of the hearing. Teeth, throat and neck are examined and a urinalysis is made. Rupture, flatfoot, varicose veins, hemorrhoids and evidence of communicable diseases are looked for. Vaccination is required in all who have not been successfully vaccinated within fifteen years. Anemia is looked for and blood pressures taken when deemed necessary. As instances of the findings among the 6,000 employees it is said that moderate elevated blood pressure was found in 28, and serious in 42, or 1.1 per cent.; moderate heart disease in 38 and serious in 18, or 0.77 per cent.; ruptures (moderate) in 116 and severe in 39, or 2.57 per cent. Eight patients with tuberculosis are under treatment in sanatoriums or by open air methods at the expense of the company. Poor teeth which should have the attention of the dentist were found in 90 per cent., and in 1,557, or 25 per cent. of all employees, the dental defects were such that failure of treatment amounted to serious neglect. By these methods of examinations carried out periodically, incipient defects are discovered, and they also afford a basis of comparison of the physical status of employees from year to year. Instances are given in which the discovery of serious defects permitted the shifting of men to other work which they could do without injury. Specially defective employees to the number of 281 are examined every

six or twelve months, and all dining room employees every three months. In accident cases the services of the company physician are available throughout until recovery, and hospital and consultation fees and the cost of roentgenograms are provided at company expense. This procedure was effective before the enactment of the workmen's compensation law. This law does not require the treatment of sickness among employees, but this constitutes a large part of the work of the medical department. From fifty to a hundred cases of minor illness are said to be taken care of every day. The department acts as a medical clearing house, determining when an employee is fit to remain at work and when he should be in bed. Employees are recommended to employ their family physicians, as determined by two questions: Would the man go to his physician if the department did not treat him, and could he afford to pay the necessary fee? A negative answer to either would determine treatment by the medical department. It is said, however, that ten patients are placed in the hands of the local medical profession to one who is taken away. Sanitary inspection each month has been arranged for in all factories, in dining rooms, workshops, washrooms, lockers, and of drinking water. A monthly health bulletin is distributed to employees, and a health manual has been prepared. —*Jour. A. M. A.*, Feb. 26, 1916.



Fatigue and Efficiency.—In a current number of *Collier's*, Dr. John B. Huber makes this comment on Fatigue and Efficiency:

"Efficiency decreases as fatigue begins, and it ends far short of exhaustion. Enterprisers find that it pays to alternate judiciously work and rest; to eliminate all unnecessary motions; to guard the worker against molestation or interruption; to have light, ventilation, and other factors agreeable; and to take counsel of the physician, the sanitarian, and the psychologist. There is, in the worker's tired brain, nerves, and muscles, danger not only to himself but to others. The number of accidents increases

progressively during the morning as fatigue comes on; drops after the noon recess; rises hour after hour until the end of the working day. The same obtains with brain work as with muscle work; there is in science really no difference. Bank managers long ago recognized the relation of fatigue to efficiency, and have therefore closed their tellers' windows at three; less expensive this than the mistakes of tired employees. How often has the overwrought dispatcher sent trains into collision! Fatigue, nerve tension, hurry, and worry are perverse and uneconomic factors; and when to these alcoholism is added the human machine—normally the best self-repairing apparatus in the world—is sure to go, most pathetically and all too prematurely, to the scrap heap. Here is what the General Safety Committee of the Raritan (N. J.) Copper Works has noted in its publication, *The Ingot*:

"Between eight and nine, the first hour of the shift, is the danger hour as to accidents; also more accidents occur on Monday mornings than at any other time; also on mornings following holidays than on the mornings of other days. To any man that can think in a straight line all this means just one thing. It is a plain fact, and we'll state it plainly: Too much drinking at night means foggy eyes and unsteady nerves next morning. Then the accidents pile up. Now, let's get right down to brass tacks. This is no grape-juice journal. We hold no brief for prohibition. What we are working for is safety. Cut down the booze and, as surely as night follows day, you will cut down the accidents.' "



The Pace that Kills.—"Doctors have told us often in late years, that our pace is too fast—that we are living not wisely but too well. Insurance companies, from motives that are entirely obvious, are urging reform; lately they have united in an effort to find out precisely what is wrong with our manner of living and to provide a remedy.

"To that end, the Life Extension Bureau of New York, through Dr. Lyman Fisk, medical director, has been making an investigation. A group of 1,000 skilled mechanics was examined and later another group of 1,000 clerks. The object, of course, was to compare the health of men who had active lives with the general

health of men whose business is of a sedentary character.

"It was found, according to word from the Doctor, that the mechanics, as a whole, were little, if any, better off than the clerks. The active workers presented fewer cases of heart disease, but more cases of thickened arteries. Bad blood pressure was slightly more prevalent among the clerks than among the factory employees, but the latter showed twice as many cases of kidney trouble as the former. They had more lung impairment, too. More than half the members of the groups were partaking daily of unsuitable diet. Doctor Fisk says further about the results:

"I feel justified in asserting that the evidence of widespread premature physical decay, which is suggested by our vital statistics, is to a considerable degree confirmed by actual examination of large groups of supposedly healthy young people. Thousands of people are slowly and inevitably preparing for physical breakdown or premature death, and there can be no more important work for modern medicine than to bring such cases, as early as possible under proper hygienic or medical guidance."

"And, he adds, 'That there is some particular influence at work causing the upward trend in mortality from organic diseases, seems probable. It may be found in our rapid industrial and social evolution, bringing about a condition of widespread prosperity and lavish expenditure—this relatively extending to the comparatively small wage-earner in the factory.'

"This is not saying much that is helpful. It is too vague to be of appreciable service. But it does prescribe simpler and more rational living, and that surely is a medicine worth trying."—*The Dodge Idea*, March, 1916.



Fitting Men Instead of Firing Them.—"When a man finds that the sleeves of his new coat are a trifle too long he may do one of two things—buy a new coat or have the sleeves shortened. There is little doubt that he would choose the latter. Yet until recently, if a workman in a factory failed in some small particular, he was promptly discharged and replaced with a new one. It is coming to be recognized, in the modern program of handling men, that in many cases fitting an unsatisfactory man to his job

is cheaper and better than firing him. This means that the boss who is skilful in handling his men—always an asset in any business—is today an imperative necessity. If we are to 'fit' instead of 'fire,' we must have expert fitters—men to know how the fitting can best be done, whether by instruction, argument, reproof, or simply by 'watchful waiting.' Says the writer of a leading article in *Factory* (Chicago, March):

"Employers are coming to realize that, even if no other motive were involved, it costs money to break in new workers. More attention than ever before is being paid to the hiring of men, in order to secure those adapted to the work, that the waste of misfits may be avoided. Similarly, 'firing' is not the light affair that it was once supposed to be.

"Modern efficiency believes in curing faults, if possible; in teaching those who are teachable; in transferring from one kind of work to another until the round peg fits the round hole. 'Firing' is regarded as a last resort, reserved for certain flagrant sins, or incompetence that has persisted through numerous opportunities.

"This means that more attention than before is being given to the personal side of industrial discipline.

"The economic advantage of the new method is easy to recognize, if not to figure in dollars and cents. In general, it may be said that the new type of discipline is based on the 'rule of reason' to a greater extent than in any previous system. Once military discipline, with no explanations and no room for questions, was favored. If the individual did not give his best work under this system, that was supposed to be the individual's loss. The loss in shop-efficiency was not considered.

"There are workers who still prefer that form; they have no desire to reason why; theirs but to do or—be fired. As a rule, they are the ones who like to avoid responsibility. Suggestions for improved methods are not likely to come from them.

"The best worker is pretty certain to be the one who appreciates a knowledge of the reasons for any deviation from routine-methods. A straight appeal to reason may even correct a fault that could be made to yield in no other way. But it must be a reason that in the mind

of the worker is not trivial, and one that comes within the range of his own point of view. . . .

"It makes little difference in what department of work a principle of management be found; it can be adapted to any other where similar conditions of humanity prevail. For men are much the same, whether employed in factory or in office, and the appeal which moves one will almost inevitably move the other.

"Perhaps the most common of faults among workers is the lack of ambition. This may show itself in many ways, but always the trouble resolves itself into a fundamental lack of interest in the work. The new science of management has absolutely reversed the old practise in dealing with this failing."—*Literary Digest*, April 1.



Physical Examination of Employees.—In a recent issue of *Safety Engineering* there appears an interesting review by Dr. W. H. Clarke of the Norton Grinding Company of Worcester, of his work at that establishment. With reference to the physical examination of employees, Doctor Clarke makes this statement:

How Thorough Should a Physical Examination Be?

"At Norton Company we find ourselves becoming more and more thorough as time goes on. Each addition to our routine has been made because of necessity and not for theoretical reasons. We now make an examination which takes from 12 to 20 minutes and which includes blood pressure but not urinalysis except in cases of 40 years or over, and in younger individuals when indicated by blood pressure of 150 systolic. Otherwise the examination is about as complete as for life insurance. The patient is completely stripped before it is concluded. We have never had any trouble from men in accepting this examination as a preliminary to being hired. In fact, the majority of men show great interest and thank the doctor for the advice which he gives them in regard to minor defects.

"It has been stated by physicians at different meetings that a complete physical examination should take at least an hour. We are willing to admit that from 12 to 20 minutes is an extremely short time in which to make a complete physical examination, but unless this short time is taken, physical examination of employees in factories

would be impossible without such a large staff of nurses and doctors that the expense would be prohibitive.

"In my work I hear a great deal from the manufacturing side. I find that the enthusiasm of the board of directors is not great toward spending large sums of money for physical examinations and it is very easy to frighten prospective adopters of this system by unnecessarily strict examinations.

"During my experience at Norton Company we have found practically no cases in which our primary physical examination proved later to have been inadequate. And such lapses, when they occur, are rapidly corrected as a result of subsequent treatment."



Large Percentage of Sickness.—The responsibility for sickness as a cause of dependency is shown by an investigation conducted by Miss Mary VanVleck of New York for the Russell Sage Foundation.

"The investigation of sickness among wage-earners is still in progress, but certain results have been obtained for the information of those interested in health insurance. From the records, supplemented when necessary by personal interviews, we learned facts about family conditions, industrial history, and environment, losses suffered through illness, the aid given by the community in relief and in care for the sick, unhealthy factors present in the occupation or in home life—in short, the real histories of families in whose misfortunes sickness has played a part in an application for relief or in the course of treatment by the Society. We kept before our minds the question, how frequently is sickness encountered as a factor in dependence?

"A preliminary study of the records of more than 6,000 cases under treatment in a single year in the Charity Organization Society showed that in 37 per cent. the sickness of wage-earners was a factor in the need for aid. In the United Hebrew Charities, the statistician reports 34 per cent. This does not mean that sickness was the sole cause of dependence, but rather that it was a condition found in a very large group of families. It is necessarily an inadequate statement, however, for it does not show that in many families now under care because of family problems other than illness, the past history

might reveal that sickness of a wage-earner was the first step toward dependence, bringing in its train many other causes of incapacity for self-maintenance.

"Under existing conditions the medical care which these wage-earners could command for themselves often was meagre. Of the 700 wage-earners we studied, we found that only 174 had made use of private physicians. The majority had gone from one hospital or dispensary to another.

Low-Paid Branches of Labor.

"Most of the families studied belonged to low-grade branches of labor. The fact that they belonged to the lower ranks of labor is often accounted for by deterioration following illnesses in the past. We found that nearly 400 of the families had appealed to friends and relatives for help. These friends belonged to a class which could ill afford to give such help, and to do so must have imperilled their own health and strength. Every kind of device to raise the income needed in the different distressed households had been tried. The wives had gone out to work; money had been borrowed, lodgers taken in, and even the children had been sent away from home to state institutions.

"In two-thirds of the cases studied, illness had lasted more than half a year at the time of investigation. Not only was it distressing to contemplate the long period over which these illnesses had extended in the past, but a physician who examined these records to find, as far as possible, the probable date of restoration to health reported a very high rate of chronic disorders.

Much Permanent Sickness.

"Of the 687 cases studied in this way, the physician estimated 295 as chronic, while 81 were likely to become progressively worse. While these figures cannot be accepted as indisputably accurate, they go to show that among the class of people studied the rate of permanent illnesses is very high. Moreover, it is not unsafe to say that more prompt medical care might have prevented such prolonged suffering, and that upon the medical institutions of the community must devolve the task of giving such prompt and adequate treatment as to guard against the hopelessness characteristic of so

many of the families cared for much later by the charitable societies.

"We can strike an effective blow at poverty by preventing sickness. The health insurance plan puts a cash value on the good health of the worker for the employers, the workers, and the taxpayers.

"The need is for an equitable distribution of the burdens of a common misfortune, for education in hygiene, for an extension of the activities of state and city departments of health, for

opportunity for thorough periodical medical examination to prevent sickness, for larger resources for effective work in hospitals and dispensaries, for better correlation of all medical agencies, and for increasingly effective control of unhealthful conditions both in homes and places of employment. The subject is large and complicated, and certainly worthy of a state commission to make a thorough study of the facts, as a basis for a well-organized programme of action."

Communications.

ANNOUNCEMENT.

The Journal desires to call the attention of its readers to the establishment of a new section devoted to "Communications." Readers are invited to address such communications to the Editor. Letters for publication should necessarily be of general interest and deal with some public health subject.

EDITOR, AMERICAN JOURNAL OF PUBLIC HEALTH.
755 Boylston St., Boston, Mass.

Dear Sir—The two articles in your March, 1916, issue, "The Control of Scarlet Fever," by A. J. Chesly, M. D., and "Is the Control of Measles and Whooping Cough Practicable?" by Francis George Curtis, M. D., bring up certain points in the practical control of contagious diseases which have been much neglected in the past. Doctor Curtis's article makes a plea for the more intelligent control of measles and whooping cough, and, while admitting the difficulties which stand in the way of practical control, calls for the abandonment of the *laissez faire* policy which has been much adopted on the one hand, and the method of strict isolation on the other hand.

I have already shown (*Jour. Inf. Dis.*, Nov. 1915) a practical method for the control of measles. Doctor Chesly presents a rather elaborate system for the study of scarlet fever out-breaks, by the collection and study of epidemiological data, and shows how this may be

modified to adapt it for the prevention of epidemics, as well as for control when an epidemic is once started.

Both of these papers are valuable in calling attention to the need of the control of these diseases by intelligent and effective methods. But no matter what methods are proved in practice to be successful, they will fail unless administered by full-time health officers with adequate technical training. It is well nigh useless to expect the average practitioner-health officer, who gives but a small part of his time to public health work, to become proficient in such methods, or to apply them in actual practice. The great need in public work is the full-time properly trained health officer; having him, a community may expect that intelligent methods for the prevention of disease will be put into effect.

Respectfully yours,

HAROLD F. GRAY.

Health Officer,
Palo Alto, California.

Legal Decisions.

Legal Journal Discusses the Working Man's "Inalienable Right to Rest."—A recent decision of the Supreme Judicial Court of Massachusetts is made the occasion for an interesting and thoughtful article in the *Harvard Law Review* by Prof. Felix Frankfurter, Professor of Law, Harvard. This case invalidates the Massachusetts Statute limiting the hours of work for certain railroad station employees to nine hours per day in ten hours. The Supreme Court held this statute to be invalid because it "Is an unwarrantable interference with individual liberty and an interference with property rights and these are contrary to the Constitutions which secure these fundamental rights." The article discusses and reviews a long line of decisions based on the constitutionality of various statutes fixing and limiting hours of labor (a) For women and children. (b) In admittedly dangerous occupations. (c) In general. It appears that the general run of decisions uphold this type of statute in classes a and b. The weight of authority in class c, however, would seem to be against the validity of statutes like the one in question. Professor Frankfurter points out that every case of this type must be considered as an individual case and should not be decided on a basis of mere theoretical economics and legislation. The fact is that we are coming to realize more and more adequately the relationship between health and work. The argument, based on the Fourteenth Amendment, which is, of course, at the bottom of all the decisions adverse to statutes of this sort is a much vaunted right of the individual to contract for the sale of his labor without restriction. Mr. Frankfurter cites a case where the court calls attention to the fact that it is usually the employer who complains because the workman's right is thus being infringed and that the workman himself is not observed to be exercised over the restriction that is placed upon his right to sell his liberty. This court further remarks that the right to rest may some day come to be considered quite as much one of the inalienable rights granted to the individual under the Constitution of the United States.

This article while it is, of course, primarily a technical legal discussion, is of interest to those

engaged in the work of public health on account of the manner in which it reviews the judicial attitude towards the health and social legislation which is becoming a larger and larger item in our increasing body of statute law in its process of evolution.

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Harrison Anti-Narcotic Law—Records to Be Kept by Physicians—Section 2 Construed: *United States v. Charter*, 227 Fed. Rep. 331.—"Defendant is indicted under this portion of section 2:

"Every person who shall give an order as herein provided to any other person for any of the aforesaid drugs shall, at or before the time of giving such order, make or cause to be made a duplicate thereof on a form to be issued in blank for that purpose by the Commissioner of Internal Revenue, and in case of the acceptance of such order, shall preserve such duplicate for said period of two years in such a way as to be readily accessible to inspection by the officers, agents, employees, and officials hereinbefore mentioned. Nothing contained in this section shall apply—

"(a) To the dispensing or distribution of any of the aforesaid drugs to a patient by a physician, dentist, or veterinary surgeon registered under this act in the course of his professional practice only: *Provided*, That such physician, dentist, or veterinary surgeon shall keep a record of all such drugs dispensed or distributed, showing the amount dispensed or distributed, the date, and the name and address of the patient to whom such drugs are dispensed or distributed, except such as may be dispensed or distributed to a patient upon whom such physician, dentist, or veterinary surgeon shall personally attend; and such record shall be kept for a period of two years from the date of dispensing or distributing such drugs, subject to inspection, as provided in this act."

"It is charged in the indictment in each count that the defendant gave an order to a certain person for one of the prohibited drugs; that he failed to preserve a duplicate of the order for two years, as provided; and that he failed to keep a record of the amount of the drug by him then and there dispensed and distributed."

The defendant pleaded not guilty and requested leave to withdraw his plea and file first a motion to quash and, in case the motion should be overruled, a demurrer.

The motion and demurrer are both to the point that the act violates certain provisions of the Constitution the most interesting in the present connection being that it is an act actually designed to regulate the use of certain drugs, but is masquerading as one purporting to raise revenue; that it is not uniform in its character, but is intended to affect a special class of persons only, namely, physicians, dentists, veterinarians, and druggists.

The court says: "The indiscriminate and un-

restrained use of opium, coca, and their derivatives is well known to be a great evil, gravely affecting the general welfare of the country. These are exclusively foreign products, and it is entirely within the power of Congress, in the interest of the general welfare, to exclude their importation entirely, or to so regulate the traffic in them in this country that their importations may be traced. A careful study of the act shows that the various provisions for registration, recording, etc., are effective in the tracing of the origin of a drug derived from these foreign products, to the end that infractions of the revenue laws may be ascertained."

Personal Notes

The prize of \$1,000 given by the Metropolitan Life Insurance Company through the American Social Hygiene Association for the best pamphlet on Social Hygiene for Boys and Girls has been awarded to Dr. and Mrs. Donald B. Armstrong of Stapleton, Staten Island. Doctor Armstrong is the director of the Social Welfare Department of the New York Association for Improving the Condition of the Poor, and Mrs. Armstrong is actively interested in social and philanthropic work.

The prize was offered in order to encourage a satisfactory treatment of the problems of sex and reproduction for use in the instruction of adolescents. The general quality of the whole group was surprisingly good and it is a noteworthy fact, especially in view of the subject-matter of the competition, that there were submitted almost no freak or sensational productions. The winning manuscript will be published in the next issue of the American Social Hygiene Association's quarterly together with an account of the contest.

Edward A. Moree, assistant secretary of the New York State Charities Aid Association, has been appointed director of the Atlantic Division of the Red Cross with headquarters in New York City. The division includes 21 states east and south of the Ohio River and east of the Mississippi. Mr. Moree will have charge of emergency relief work in disasters and with the forming of new Red Cross chapters in the campaign for a

million members. In addition to a wide range of duties for the State Charities Aid Association, he has been secretary of the commission which investigated the public health situation in New York and drafted the new state health code. He is now advisory expert in public health education in the State Department of Health.



Dr. John T. Leavitt, city health officer of Camden, N. J., has been appointed chief of the medical staff of the Municipal Hospital for Contagious Diseases, which will be opened in Camden during the week of May 18.



Dr. C. V. Craster has been appointed health officer of Newark, N. J.



The following persons were elected to membership in the American Public Health Association: Charles Carter, Parsons College, Fairfield, Iowa, Professor of Biology.

Raymond J. Cary, Mt. View Sanatorium, Lake View, Wash., Physician.

William Lee Hart, Madison Barracks, N. Y., Captain Medical Corps.

Theodore C. Merrill, Washington, D. C., Physician.

Bessie E. Ammerman, New York City, Superintendent of Nurses, Henry Street Settlement.

Dr. Filberto Rivero, Havana, Cuba, General Inspector, Health Department.

Samuel M. Schmidt, Boston, Mass., Health Inspector.

Henry L. B. Coote, Michigan City, Ind., Veterinarian.

Charles M. Talbert, St. Louis, Mo., Civil Engineer.

Miss Myrtle E. King, Minneapolis, Minn., Registrar of Vital Statistics.

Harry J. Krum, Allentown, Pa., City Chemist and Bacteriologist.

Philip W. Engel, Chicago, Ill., Vice-President, International Filter Company.

Sol Pincus, Hygienic Laboratory, Washington, D. C., Sanitary Engineer.

William W. Smith, Portsmouth, Ohio, Physician.

Enos S. Spindel, Springfield, Ill., Physician.

Carl Ziegler, Cincinnati, Ohio, Director Physical Education, Public Schools.

George D. Lummis, Middletown, Ohio, Physician and Health Officer.

Dana E. Robinson, New York, U. S. Public Service, Ellis Island.

Ed. J. Schwartz, M. D., Salem, Ohio, Health Officer.

Edward M. Van Cleve, New York, Managing Director, National Commission for Prevention of Blindness.

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Dr. Milton J. Rosenau, director of the School for Health Officers, Harvard University and the Massachusetts Institute of Technology, has been

appointed to give the Harrington Lectures at the University of Buffalo Medical School on May 30, 31 and June 1, 1916. Two lectures will be given on "Anaphylaxis" and the third will be on "Education for Public Health Service as a Career."

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Dr. Stanley H. Osborn, a recent graduate of the School for Health Officers, Harvard University and the Massachusetts Institute of Technology, has been appointed district health officer by the Massachusetts State Department of Health.

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The County and City Board of Health of Tuscaloosa, Ala., has recently appointed Mr. A. F. Allen as assistant health officer. Since his graduation from the Harvard-Technology School for Health Officers, Mr. Allen has been connected with the health work of Waltham, Mass., and with the epidemiological work in Fitchburg, Mass.

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Dr. H. H. Mitchell has been appointed epidemiologist to the Indiana State Board of Health. Dr. R. W. E. Cole has been reappointed health officer of the town of York, Maine.

Current Public Health Literature.

AMERICAN.

The American City.

March.

The Topeka Public Health Nurses Association. Grace Overmyer.

Motor Trucks for Refuse Collection. S. A. Greeley.
Activated Sludge as a Fertilizer. E. Bartow and W. D. Hatfield.

American Journal of Clinical Medicine, Chicago.

XXIII. March.

Bacillus-coli Cystitis and Its Successful Treatment. J. F. Biehn.

Vaccine and Serum Therapy in Everyday Practice. W. C. Wolverton.

April.

The Therapeutic Indications Suggested by Routine Blood Examination. B. G. R. Williams.

Vaccine and Serum-Therapy in Everyday Practice. Part III. W. C. Wolverton.

American Journal of Tropical Diseases and Preventive Medicine, New Orleans.

III. March.

Medical Notes on Jamaica. J. F. Siler.
Deep Sea Diving and Its Relation to Caisson Disease. C. H. Halliday.

Boston Medical and Surgical Journal.

L. March 9.

Field Work of the State Department of Health on Communicable Disease. William W. Walcott.

Engineering News.

LXXIII. March 11.

City Planning on an Exceptionally Large Scale is Meeting with Public Approval at Philadelphia.

March 18.

Subway Air Exceeds Health Boards Standards, Ventilating Experts Find.

March 25.

Cleveland's Sewage Treated by Revolving Screens and Novel Grit Chambers. George B. Gascoigne.

Interstate Medical Journal, St. Louis.

XXIII. March.

Therapeutic Measures for Pulmonary Tuberculosis Suggested during 1915. E. N. Packard, Jr.

The Immigrants in America Review, New York.

I, No. 4. January.

Sanitary Preparedness—The Need of a Uniform and Efficient Quarantine Service. E. H. Lewinski-Corwin.

A Social Coöperative Movement. Alexander Fleisher.

Journal of the American Medical Association, Chicago.*LXVI. February 26.*

Present Views in Respect to Modes and Periods of Infection in Tuberculosis. M. P. Ravenel.
 Diphtheria Carriers. Guger, Kelly, and Bathgate.
 Cultural Experiments with *Spirochaeta Pallida*. Wile and Kruif.

Sanitation and the Control of Pellagra. C. T. Nesbitt.
March 4.

State Health Organizations. C. V. Chapin.
 Some Essentials to the Development of Efficient Health Organizations. J. W. Kerr.

Hay-Fever: Its Cause and Prevention. W. Scheppegrell.

Pollen Extracts and Vaccines in Hay-Fever. Strousse and Frank.

March 11.

The Treatment of Diphtheria Carriers with Iodized Phenol. Ott and Roy.

The Follow-Up System of the Presbyterian Hospital in New York City. J. A. Corscaden.

The Control of Diphtheria Epidemics. W. D. Stovall.
 The City's Need of a Psychopathic Clinic. Stewart Paton.

March 25.

Diphtheria in Manila. A. P. Goff.
 Studies in Diphtheria. II. Ruh, Miller and Perkins.

The Use of Kaolin to Remove Diphtheria Bacilli from the Nose and Throat: Further Observations. B. Rappaport.

Vaccines of Favus and Ringworm. C. H. Lavinder.
 Foot-and-Mouth Disease in Man. Sutton and C'Donnell.

Journal of the American Water Works Association, Baltimore.*III, No. 1. March.*

Variation in Precipitation as Affecting Water Works Engineering. C. P. Birkinbine.

Effect of Solutions of Filter Alum on Brass Pipe Fittings. G. R. Spaulding.

Filter Operation. Tolson and Van Loan.
 Iron Removal by Rapid Sand Filtration. F. E. Hale.

Water Softening Practice. S. A. Greeley.
 The Development of Rapid Sand Filters in Ohio.

Philip Burgess.
 Sources of Water Pollution. J. W. Hill.

Methods of Sending Specimens of Water. J. J. Hinman, Jr.

The Relationship of the Epidemiologist to Water Works Men. Mark F. Boyd.

Experiments in Water Softening with a Zeolite-like Substance. R. N. Kinnaird.

Journal of Laboratory and Clinical Medicine, St. Louis.*I. March.*

Observations on Typhoid Fever in Detroit. H. F. Vaughan.

Immunity in Tuberculosis. G. B. Webb.

Journal of Outdoor Life.*XIII. March.*

Tuberculosis and Bad Housing. Mrs. A. F. Bacon.

House Infection: A Potent Source of Tuberculosis. I. W. Brewer.

Relative Prevalence of Tuberculosis under Good and Bad Housing Conditions. Charles J. Hastings.

Medical Times, New York.*XLIV. March.*

A Study of House Dust. J. W. Redway.

Progress in Public Health During 1915. L. R. Williams.

Jurisprudence of the Alcohol Problem. Andrew Wilson.

Modern Hospital, St. Louis.*VI. March.*

The Hospital Laboratory—Its Purposes and Methods. R. M. Pearce.

Compulsory Health Insurance for Every Individual. Olga S. Halsey.

Social Hygiene Department. Progress 1900-1915. William F. Snow.

New York Medical Journal.*CIII. March 4.*

Recovery of *Streptococcus Viridens* from New York Street Dust. William C. Thro.

Poisonous Proteins. Victor C. Vaughan.

March 11.

The Standardization of Disinfectants. T. Ainslie Walker.

March 18.

Therapy as Related to the Immunology of Tuberculosis.

March 25.

The Prevention of Fire in Old Buildings Housing the Insane. J. Allen Jackson.

New York State Journal of Medicine.*XVI. March.*

The Schick Reaction and Its Applications. A. Zingher.

Hereditary Syphilis in Children. L. E. La Fetra.

Hereditary Syphilis. LeG. Kerr.

Some Remote Causes of Bad Feeding. F. von der Bogert.

The Nurse, Jamestown, N. Y.*March.*

Influenza—Its Prevention and Treatment. L. Neuwelt.

The Role of the Visiting Nurse IV. The Nurse in School. Stella Fuller.

The Dental Nurse. A New Profession for Women. A M. Nodine.

Public Health Journal, Toronto*VII. March.*

Rural Sanitation. A. C. Jost.

Bacteriology and Specific Treatment of Lobar Pneumonia. Rufus Cole.

Medical Inspection of Rural Schools. S. A. Fulton.

Some Pressing Problems of Modern Times. Sir Thomas Oliver.

Tuberculosis in the Public Schools of Toronto. F. S. Minns.

Social Hygiene.*II, No. 2. April.*

Obstacles to Vice Repression. Frederick H. Whitin.

The Educational Attack on the Problems of Social Hygiene. Maurice A. Bigelow.

The Sex Taboo. Hugh A. Moran.

The Psychological Influence upon Adolescent Girls of the Knowledge of Prostitution and Venereal Disease. Miriam C. Gould.

The In-Patient Hospital in the Study and Control of Syphilis. John H. Stokes.

International Agreements in Relation to the Suppression of Vice. James Bronson Reynolds.

Social Hygiene Legislation in 1915.

Southern Medical Journal, Birmingham.*IX. March.*

Critical Study of the Wasserman and Luetin Tests Done Simultaneously on 500 Cases. H. L. McNeil.

Intensive Community Health Work. John A. Ferrill.

Rural Sanitation in the South. J. Howell Way.

Sanitating a Rural Home. R. N. Whitfield.

A Plea for the Conservation of Health. Harry J. Mustard.

United States Public Health Reports.*XXXI. March 3.*

Rocky Mountain Spotted Fever. L. D. Fricks.

March 10.

Demonstrations of Malarial Control. R. H. von Ezdorf.

March 17.

Death Rates of the Colored Population. John W. Trask.

March 24.

Competent Health Officers. W. C. Rucker.

Occupational Intoxications. Martin I. Wilbert.

Anopheles Crucians. M. Bruin Mitzmain.

FOREIGN.

GREAT BRITAIN.

Journal of the Royal Sanitary Institute, London.

XXXVII. *March.*
 An Outbreak of Food Poisoning. W. Angus.
 The Construction of the Royal Military Camp Sewage—
 Disposal Works at Ripon. Arthur W. Smith.
 Defective Lighting and Ventilation in Blocks of Flats.
 Charles Porter.

Journal of State Medicine, London.

XXIV. No. 3. *February.*
 Water Supply on the March. C. H. Melville.
 Physical Deterioration in its Relation to the Industrial
 Classes. Harry J. Wilson.
 Coli-like Microbes in Water as an Index of Sewage
 Contamination. T. Zammit and F. Rizzo Marich.
 Some Points in the Causation of Occupational Derma-
 titis. Frederick Gardner.
 Fifteenth Annual Report of the Canadian Association
 for the Prevention of Tuberculosis. 1915.

Medical Officer, London.

February 19.
 Immunity: Natural and Acquired. J. Foster Palmer.
 The Ground Level Latrine. Francis E. Fremantle.
February 26.
 Doctor Newsholme's Report for 1914-1915.
March 4.
 A New Type of Open Air School. G. H. Widdows.
March 11.
 An Epitome of Recent Literature in Bacteriology, Pro-
 tozoology, etc. Alexander G. R. Foulerton.
 Standard of Purity of Food Supplies in War Time, and
 the Utilization of Condemned Stores. J. Wright
 Mason.

FRANCE.

Paris Medical.

VI. *January 15.*
 The War and Tuberculosis. Landouzy.
 Prophylaxis of Tuberculosis during the War. Rénou.
January 22.
 The Destruction of Rats in the Trenches. Loir and
 Legagneux.
 Importance of Alcoholism as a Factor in Typhoid Mor-
 tality. Labbé.

February 19.
 Vaccination at Any Age. Perrin.

Press Médicale.

XXIV. *January 10.*
 Measures to Arrest the Spread of Venereal Disease. Bal-
 zer.
January 17.
 Charts Showing the Decline of Typhoid Fever since
 Vaccination. Labbé.
February 10.
 Triple Vaccination against Typhoid and Paratyphoid.
 Widal and Courmont.
 Malignant Measles. Longin and Camuset.

GERMAN EMPIRE.

Deutsche medizinische Wochenschrift.

XLII. *January 6.*
 Canned Culture Mediums. Dold.
 Simplified Technic for Bacteriological Research.
 Brauer.
 Compulsory Hospital Treatment as Penalty for Ex-
 posing Others to Venereal Disease. Blaschko and
 Ebermayer.
January 13.
 Two Weeks Quarantine for Cholera. von Darangi.
February 10.
 Simpler and More Rapid Method for Cultivation of
 Typhoid Bacilli from the Blood. Shürman.
 Organization of the Medical Inspection of Schools in
 Germany. Süpple.

Medizinische Klinik, Berlin.

XI. *December 26.*
 Technic of and Experiences with Vaccination against
 Cholera and Typhoid. Biyurd.
 Simplified Technic for Counting Bacilli in Sputum.
 Martin.

XII. *January 23.*
 Well Contaminated with Colon Bacilli as a Cause of
 Pneumonia. Windrath.

Munchener medizinische Wochenschrift, Munich.

LXIII. *January 25.*
 Official Directions for Prophylaxis of Scarlet Fever.
 Henkel.

BOOKS RECEIVED.

The Adolescent Period, by Louis Starr, M. D.,
 LL. D. Philadelphia: P. Blackiston's Son &
 Co., 1915. Pp. 192. Cloth, \$1.00.

Infant Feeding and Allied Topics, by Harry
 Lowenburg, M. D. Philadelphia: F. A. Davis
 Company, 1916. Pp. 373. 64 Text Engrav-
 ings, 30 Full-page Plates. Cloth, \$3.00.

The New Chivalry—Health. Edited by James
 E. McCulloch. Nashville, Tenn.: Southern
 Sociological Congress, 1915. Pp. 551. Cloth,
 \$2.00.

**Report on the Medico-Military Aspects of the
 European War**, by Surgeon A. N. Fawcett, M. D.,

U. S. N. Washington, D. C.: Bureau of
 Medicine and Surgery, Navy Department,
 1915. Pp. 140. Many Illustrations.

A. S. M. C. Year Book—1916. New York:
 The American Association of Mechanical
 Engineers. Pp. 442. Price to non-members,
 \$1.00.

**Painless Childbirth, Eutocia and Nitrous
 Oxid-Oxygen Analgesia**. By Carl Henry
 Davis, A. B., M. D., Associate in Obstetrics
 and Gynecology, Rush Medical College, etc.
 Chicago: Forbes and Company. 1916. Price,
 \$1.00.

American Journal of Public Health

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Vol. VI

MAY, 1916

No. 5

DIPHTHERIA IMMUNITY—NATURAL, ACTIVE AND PASSIVE. ITS DETERMINATION BY THE SCHICK TEST.

WILLIAM H. PARK, M. D., and ABRAHAM ZINGHER, M. D.

(From the Research Laboratory and the Willard Parker Hospital, Department of Health, New York City.)

THE definite association between the presence of antitoxin in the blood and immunity to diphtheria has been firmly established by the efficiency of passive immunizing doses of antitoxin in protecting individuals against diphtheria, and also by finding a complete absence of antitoxin in those who develop clinical diphtheria.

The presence of natural immunity to diphtheria in a large number of people has become a well-established clinical fact—this immunity is generally associated with the presence of antitoxin, as shown by finding it in measurable quantities in the blood of the majority of such individuals. A small percentage of individuals seem to be protected by bactericidal rather than antitoxic substances. The determination of the presence of antitoxin by the older methods requires much time and the use of guinea pigs. Schick's merit is that he devised a simple clinical test by which we can easily determine the presence of antitoxic immunity.

The reaction depends on the local irritant action of minute quantities of diphtheria toxin when injected intracutaneously. If antitoxin is absent in the cutaneous lymph, or present only in very small amounts, insufficient for neutralization, a positive reaction will appear in twenty-four to forty-eight hours. This is characterized by a circumscribed area of redness and slight infiltration which measures from 1 to 2 cm. in diameter. It persists for 7 to 10 days, and on fading shows superficial scaling and a persistent brownish pigmentation. The amount of toxin injected as advised by Schick is 1/50 MLD. for the guinea pig in .1 cc. of normal saline. We prefer 1/50 MLD. in .2 cc., on account of a fairly severe local reaction seen occasionally with the greater concentration of the toxin in individuals in whom not even a trace of antitoxin is present.

It is important to distinguish the true reaction from a pseudo-reaction which is found extremely rarely in young children, in a small percentage of older children, and more frequently

in adults, who have antitoxin in either a small or large amount. These reactions are probably local sensitization phenomena of a protein character (local anaphylaxis) since similar reactions can be obtained almost uniformly in these persons with dilutions of an autolysate of the Klebs-Löffler bacillus (endotoxin) which is free of toxin, or with heated toxin (75° C. for 5 minutes) in which the soluble toxin has been destroyed. In a few cases, the beef broth, less diluted however, will give the same result. The pseudo-reaction can be distinguished clinically in most cases from the true reaction. It appears earlier (six to eighteen hours), is more infiltrated in some of the cases, less sharply circumscribed, and disappears usually in forty-eight to seventy-two hours. At its height the pseudo-reaction is characterized by a small central area of redness surrounded by a secondary areola which gradually shades off into the surrounding skin. It leaves on fading only a faintly pigmented area, which, in our experience, very seldom shows superficial scaling. Occasionally a combined true and pseudo-reaction is seen. In these cases the true reaction remains, after the pseudo-reaction has disappeared, and finally shows the typical scaling and pigmentation. In the rare cases in which the nature of the reaction remains in doubt, it is best to consider the reaction as positive.

It is best to control the pseudo and combined reactions with toxin heated to 75° C. for five minutes. If the control gives a reaction similar to the original test, and both fade in about three days, the test may be considered

as a pseudo-reaction and the individual as being immune. If the control test is less marked than the original test, and the evidence of a positive reaction remains after the secondary areola fades in the original test (a distinct area of brownish pigmentation with superficial scaling), it may be considered as a combined reaction and the individual as not being immune to diphtheria.

For the carrying out of the test, it is essential to have an accurate syringe with a sharp, but short-pointed fine needle. The usual 1 cc. "Record" tuberculin syringe with a fine platinum-iridium needle answers the purpose well. A standard ripened diphtheria toxin is used, of which the MLD. for the guinea pig has been carefully estimated. One hundred times that amount is diluted with sufficient sterile salt solution to give 10 cc. of a *primary dilution*. For example, if the MLD. = 0.007 cc., then 0.7 cc. of toxin is added to 9.3 cc. of saline. The primary dilution keeps in the ice-box for two weeks. For daily use, or whenever required, a *fresh final dilution* is made by adding 1 cc. of the primary to 99 cc. of salt solution. 0.2 cc. of the final dilution represents 1/50 MLD., the amount used in the test. The final dilution should not be used after 24 hours. For the greater convenience of the general practitioner and hospital worker, an outfit has been devised, which consists of a capillary tube, that contains a little over one MLD. of undiluted diphtheria toxin, a small rubber bulb, similar to the ones used in vaccine outfits to expel the toxin, and a bottle containing 10 cc. of sterile physiological salt solution. By dilut-

ing the toxin with the saline, a solution is quickly prepared which is ready for the test. The outfits, if kept cold, will remain good for six months; the diluted solution should not be used, however, after 12-24 hours.

The toxin is injected intracutaneously on the flexor surface of the forearm or arm. If properly carried out, a distinct wheal-like elevation with prominent openings of the hair follicles appears at the site of injection. A good guide in the insertion of the needle is to be able to see the oval opening of the needle through the superficial layers of the epidermis. We have found that the toxin diluted so that 1/50 MLD. is represented by 0.2 cc. instead of 0.1 cc. as recommended by Schick, is better for the reason that the more diluted toxin is less apt to cause, in unprotected individuals, severe reactions, with occasional superficial necrosis; another reason is that the larger volume of fluid is more easily handled.

Though the intensity of the reaction varies in different individuals, a well-marked redness indicates an almost complete absence of antitoxin. Faint reactions point to the presence of very small amounts of antitoxin, which are not sufficient, however, to certainly protect the individual against diphtheria, but do prevent the constitutional poisoning. To prevent the appearance of the reaction, according to Schick, at least 1/30 unit of antitoxin per cc. of blood is required. This amount he considers sufficient to protect against diphtheria. According to v. Behring, even as little as 1/100 unit of antitoxin will protect against the disease in uncomplicated cases.

The Schick reaction was carried out during the past eighteen months on all patients entering the scarlet fever pavilion of the Willard Parker Hospital. In all, 1,200 patients were thus tested, and of these, 656, or 54.7 per cent., gave negative reactions. Only cases giving positive reactions were immunized; those giving a negative reaction received no immunization, but were carefully observed. Although about 20 per cent. of the negatively reacting patients became bacillus carriers during their stay in the wards, no cases of clinical diphtheria developed among them.

The remaining 544 patients who gave positive reactions received in practically all cases some form of active immunization. Among those who reacted insufficiently to active immunization with toxin-antitoxin mixtures or vaccines made from the Klebs-Löffler bacillus, 72 developed clinical diphtheria. The majority of the cases were of a mild tonsillar or anterior nasal type.

According to age the number of reactions obtained were as follows:

TABLE 1. SCHICK REACTIONS AMONG SCARLET FEVER PATIENTS.

Age.	Total.	- Schick.	+ Schick.	Per cent. + Schick.
6 mos.-1 year...	10	5	5	50.0
1-2 years.....	68	22	46	67.6
2-4 years.....	223	93	180	65.9
4-6 years.....	249	116	133	53.4
6-8 years.....	196	123	73	37.2
8-15 years.....	237	171	66	27.8
Over 15 years....	167	126	41	24.5
	1,200	656	544	45.3

Several groups of healthy persons were also tested with the following results:

TABLE 2. SUMMARY OF SCHICK TESTS IN 2,700 NORMAL CHILDREN.

Age.	Total.	- Schick.	+ Schick.	Per cent. + Schick.
2-4 years.....	62	42	20	32.2
4-6 years.....	318	236	82	25.7
6-8 years.....	444	347	97	21.8
8-10 years.....	597	462	135	22.6
10-12 years.....	584	459	125	21.4
12-14 years.....	506	416	90	17.7
14-16 years.....	189	158	31	16.4
14-16 years.....	189	158	31	16.4
	2,700	2,120	580	21.4

TABLE 3. SCHICK'S RESULTS.

Age.	Total.	- Schick.	+ Schick.	Per cent. + Schick.
Newborn.....	291	275	16	7
1st year.....	42	24	18	43
2-5 years.....	150	55	95	63
5-15 years.....	264	133	131	50
	747	487	140	34.9

From these results, then, we may assume that the percentage of individuals susceptible to diphtheria is greatest between the ages of one to four years. It is less during the second six months of life and less in older children and in adults. Our results in scarlet fever cases closely approach those obtained by Schick, whose table shows positive reactions in 7 per cent. of the newborn, in 43 per cent. during

the first year of life, in 63 per cent. between two and five years and 50 per cent. between five and fifteen years. In adults the positive reactions were not more than 10 per cent.

In the group of normal individuals it is important to note that only from 16-33 per cent. of the children between 4 and 16 years of age gave positive Schick reactions. This fact is of significance in the active immunization with mixtures of diphtheria toxin-antitoxin, in that it becomes quite practical to attempt to immunize such a relatively small part of the child population.

In an interesting study of the relationship of the antitoxin content of the blood of the mother and newborn, v. Gröer and Kassowitz found that 84 per cent. of mothers and their newborn show a considerable amount of natural antitoxin. The antitoxin of the infant is evidently derived from the mother through the placenta, and because of its frequency it is regarded as a physiological phenomenon. The mothers also showed a pseudo-reaction in 47.5 per cent. of cases. This is an unusually high percentage and the toxic culture fluid must have been exceptionally rich in extract of the bacillus substance. Similar reactions could be obtained in these mothers with the same culture fluid after it was neutralized with diphtheria antitoxin. In 11 per cent. of the newborn, they obtained a negative Schick reaction, even though the blood examination revealed an entire absence of antitoxin. This they considered as due to the fact that the reaction on part of the newborn to toxin did not show itself by the usual clinical signs.

During systematic testing of groups of children according to families, we were impressed with the frequency with which all the children of the same family gave a similar reaction. If variations were found, the younger children always gave the positive reactions. If the youngest child had a negative reaction all the older children were usually negative. On the other hand, if the oldest child in a family gave a positive reaction, the younger children with very few exceptions showed positive reactions. These striking facts are additional proofs that there are factors, possibly hereditary in character, which in the absence of infections with the Klebs-Löffler bacillus (v. Behring, Klein-schmidt) give rise to the presence of the so-called natural antitoxin. The large amount of antitoxin which is present in some of the cases is hard to explain; for example, two young children, six and one-half and three years of age, who had no history of clinical

diphtheria, showed respectively fifteen and nineteen units of natural antitoxin per cc. of serum. The large proportion of older children and adult persons having antitoxin adds to the difficulty of considering the natural antitoxin as usually due to a previous infection with diphtheria bacilli either as a case or as a carrier. In a recent investigation published by v. Gröer and Kas-sowitz, they showed that the combining, the physical and the chemical characteristics of the antitoxin present in persons who had never had diphtheria appear to be identical with those of the antitoxin produced by active immunization.

With this test Schick attempted to place on a more rational experimental basis some interesting clinical problems in connection with the prophylactic and therapeutic dosage and mode of administration of antitoxin. By making the test at regular intervals previous to the injection of antitoxin, he found that neutralization of toxin in

TABLE 4. RELATIVE EFFICIENCY OF DIPHTHERIA ANTITOXIN ADMINISTERED IN DIFFERENT WAYS.

Name.	Age.	Units.	Admin.	20 hr. Prev.	6 hr. Prev.	4 hr. Prev.	2 hr. Prev.	Simul.	2 hr. Subseq.
A. N.	6 ¹	1,000	S. C.		+++	+++	++	±	—
J. R.	4 ⁹	1,000	I. M.		+++	+++	+	—	—
I. W.	5 ⁶	1,000	I. V.		+	±	—	—	—
W. S.	5	20,000	S. C.		±	±	—	—	—
A. F.	6 ⁵	10,000	I. V.	++					
G. S.	6	10,000	I. M.	+++					
F. M.	6 ²	10,000	S. C.	+++					

S. C. = subcutaneous.

I. M. = intramuscular.

I. V. = intravenous.

contact with tissue cells was still possible up to a certain number of hours. This was shown by the partial or complete suppression of the reaction. The efficiency of the injected antitoxin depended on the mode of administration and the size of the dose.

We carried out some parallel experiments (see Table 4) attempting at the same time to see approximately how much more effective the same dose of antitoxin was when given intravenously than when given subcutaneously or intramuscularly. The Schick test was made six hours, four hours and two hours before and at the time of the injection of the antitoxin. With 1,000 units given intravenously the reaction from the toxin injected six hours previously was considerably weakened, though not entirely suppressed. The reaction from the toxin given four hours before appeared very faint, while the test given two hours before was negative. One thousand units given subcutaneously had no effect on the toxin given four and six hours previously, and only weakened the reaction made by the toxin given two hours before, while that from the simultaneous injections was just visible. The same amount (1,000 units) given intramuscularly had a somewhat stronger effect than the subcutaneous injection, and prevented the appearance of a reaction from the simultaneous injection.

To obtain the same effect with the subcutaneous as was obtained with the intravenous injection of antitoxin, from ten to twenty times the amount was needed; 20,000 units given subcutaneously were able to affect the

reaction due to the toxin given six hours previously to the same extent as 1,000 units given intravenously. When the Schick test was made twenty hours before the injection of the antitoxin, the intravenous injection of even 10,000 units of antitoxin had only a very slight effect in lessening the reaction, while the subcutaneous and intramuscular injection of the same amount of antitoxin had no effect whatever upon the reaction. In very toxic forms of diphtheria, therefore, where a large amount of toxin has already come in contact with the cells of the body with a resulting greater or less amount of fixation, large doses of antitoxin (10,000–20,000 units) should be given intravenously to neutralize as much as possible the effect of such partially-fixed or contact toxin. No further injections will then be necessary.

The Schick reaction was also used to determine the duration of passive immunity after the usual dose of 1,000 units of antitoxin. This was found to vary in the great majority of cases between twenty-one and twenty-five days, although occasionally we have obtained a positive reaction at the end of fifteen to eighteen days. This corresponds with clinical observations of diphtheria developing in passively immunized persons. The effect of a previous injection of antitoxin upon the duration of passive immunity as given by a second dose of antitoxin can also be studied in a very interesting way by using the Schick reaction. According to v. Behring, a primary injection of 1,000 units of antitoxin will protect for three to four weeks, whereas a sec-

ondary injection of a similar amount given at a time when the body is still sensitized by the first injection, will protect for only five to seven days. This increased destruction of antitoxin is attributed by v. Behring to the production in the body, as a result of the first injection of the antitoxic horse-serum, of a proteolytic ferment, which causes a more rapid breaking down of the second dose of antitoxin. Römer and Viereck, and Lewis have shown the same increased destruction of antitoxin in sensitized animals.

Last year we had an opportunity of verifying these statements during an epidemic of diphtheria in a colored orphan asylum at King's Park, L. I. About 150 children who gave positive Schick reactions were immunized with 1,000 units of antitoxin. At the end of thirty days they were retested and a positive reaction again obtained. These children were reinjected with a second dose of 1,000 units of antitoxin, and we then found that fully 60 per cent. had destroyed the second dose in seven days, and another 10 per cent. in ten days. This halving of the duration of the second or third period of passive immunization as compared with the first is important to consider when a longer immunity is desired than that given by the first injection.

Kolmer and Moshage have recently claimed that in some cases of diphtheria there is a rapid destruction or neutralization of the antitoxin which had been given for therapeutic purposes. This apparent elimination was so rapid that they were able to obtain what they believed to be positive Schick reactions at the end of five

days in fully 17 per cent. of patients, who had received therapeutic doses of 10,000–100,000 units of antitoxin. This conclusion was entirely opposed to our own investigations and, since the authors made no accurate distinction between true and pseudo-reactions, we assumed that their patients had antitoxin, but gave a pseudo-reaction to the Schick test. To verify this assumption we tested forty-six patients who had had clinical diphtheria, tonsillar or laryngeal, from five to twenty-two days previously, and had then received from 5,000 to 20,000 units of antitoxin. We obtained six pseudo-reactions and forty negative reactions. The examination of the blood of the patients who had given the pseudo-reaction showed the presence of from one-half to two units of antitoxin per cc. in each case. A later paper by the same writers infers that they themselves now think that they were misled by the pseudo-reactions. It is safe to assume that every case receiving 10,000 units of antitoxin has a considerable amount of antitoxin in the blood for a period of one week.

NATURE OF IMMUNITY DEVELOPED AFTER AN ATTACK OF DIPHTHERIA.

The application of the Schick test to patients that have had diphtheria some time previously, has revealed some interesting points in connection with the type of immunity which they develop after the disease.

We attempted to trace a number of the patients who had had definite tonsillar exudates with positive cultures. Thirty-two such patients who had been treated at the Willard Parker

Hospital three to four months before, were tested by Doctor Rosenberg during an investigation of discharged contagious disease cases. Nineteen of the thirty-two gave positive Schick reactions while thirteen were negative.

Fifteen children were also tested at the Howard Colored Orphan Asylum, King's Park, L. I. Seven of the fifteen had had diphtheria about one year before; of these five gave positive and two negative reactions; eight cases had had the disease about four months ago, and of these seven gave positive and one a negative Schick reaction.

At the Willard Parker Hospital, four patients were tested who were suffering from a rather mild type of diphtheria: three tonsillar and one nasal. The Schick reactions were strongly positive on admission—no antitoxin was given, and the exudates cleared up at the end of four to five days. Tested with the Schick reaction two days after the disappearance of the exudate, it was again found strongly positive in every case. A similar strong reaction was obtained two and three weeks after the disease. These children had evidently developed little or no antitoxic immunity, and yet they made an uneventful recovery. Considering the small amount of antitoxin necessary to suppress the Schick reaction, we are forced to the conclusion that these patients had probably developed a bactericidal immunity only. The sera of these patients gave no complement fixation.

The chronic tube cases, however, who have been at the Willard Parker Hospital for more than a year, show, as

a rule, a negative reaction. Patients who had diphtheria recently (two to three months) frequently give a positive reaction which becomes negative if they remain at the hospital for another five or six months. One child who had diphtheria in November 1913, gave a positive reaction in January 1914, and a negative reaction in August 1914. Three other children who had diphtheria in March 1914, were tested about the middle of August 1914. One gave a negative, one a moderately positive and one a strongly positive reaction. They were retested two and one-half months later, and the following results were noted: The negative case remained negative; the patient that had given a moderately positive reaction showed now a very faint reaction, while the strongly positive case gave a much weaker reaction at this time. When we retested these children again two months later, *e. g.*, eight months after the illness, they all gave a negative reaction and blood examinations showed the presence of antitoxin.

The absence of antitoxic immunity in a large proportion of individuals who have had diphtheria, as seen at all tests in the children who received no therapeutic antitoxin injections, and in tests made after the disappearance of the horse antitoxin in those receiving injections, leads us to assume that diphtheria patients develop as a rule an anti-bacterial immunity, which is associated in only about one third of the cases with an antitoxic immunity. Chronic reinfections with the Klebs-Löffler bacillus, as seen in children who remain a long time in the diphtheria wards, appear to finally lead

in a majority of the cases to the production of an antitoxic immunity.

RESULTS OF INJECTION OF TOXIN-ANTITOXIN MIXTURES.

The results, obtained in children after an attack of diphtheria, are very significant in connection with those which we obtained in the active immunization with mixtures of diphtheria toxin and antitoxin.

We carried out our work on three groups of children in the scarlet fever wards of the Willard Parker Hospital. In the early stage of the work, we soon noted that all individuals, who had a natural antitoxic immunity, produced a very decided increase in the amount of antitoxin after injections of toxin-antitoxin. The response was very prompt and followed even after a single injection. These individuals were, however, naturally immune, and needed no immunizing injections.

Entirely different results were obtained in the patients who had no natural antitoxic immunity. An early response (within four weeks after the injections) to the active immunization was noted in only 25 per cent. of the injected individuals. When we re-tested them, however, from two to eighteen months later, a large proportion of those who had been refractory at first had finally become immune. This late development of antitoxin is interesting and throws some light on one of the many factors that have to be considered in the active immunization of human beings. Our results also show that we are now able to protect actively a considerable proportion of susceptible individuals, and by means

of the Schick test to control the results of such active immunization.

The following tables summarize the early and late results of active immunization:

TABLE 5. EARLY RESULTS IN GROUPS I AND II. TOXIN-ANTITOXIN.

GROUP I.		
	24 +	
Within four weeks.....	6 -	18 +
Developed diphtheria.	0	5

GROUP II.		
	90 +	
Within four weeks.....	20 -	70 +
Developed diphtheria.	0	17

In this and the following tables—

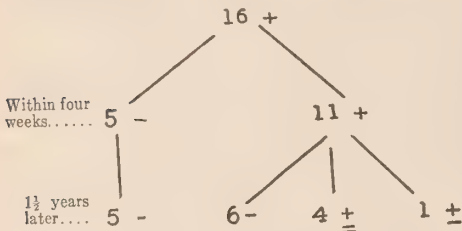
- Indicates negative Schick reaction or presence of antitoxin.
- \pm Indicates faintly positive Schick reaction.
- \pm Indicates moderately positive Schick reaction.
- + Indicates strongly positive Schick reaction or absence of antitoxin.

In Group I (see Table 5), sixty-eight patients were actively immunized. Of these, forty-four had natural antitoxin and all gave within four weeks after the injections a decided increase in the antitoxin content; none developed diphtheria. Of the remaining twenty-four patients, who had no perceptible

natural antitoxin, six gave rise to early antitoxin production, *e. g.*, within four weeks after the immunization, while eighteen failed to appreciably respond.

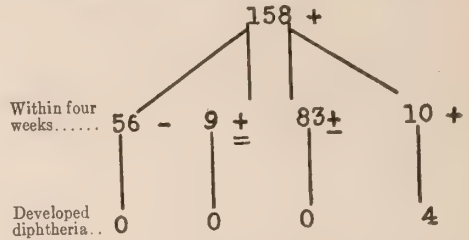
In Group II, ninety patients were selected who had no antitoxin, as shown by blood examination and by a positive Schick reaction. Of the ninety, twenty responded to the injections of toxin-antitoxin with the production of sufficient antitoxin to protect against diphtheria. The remaining seventy produced very little or no antitoxin within four weeks, as determined by the Schick test and blood examination. Of these seventeen developed clinical diphtheria.

TABLE 6. EARLY AND LATE RESULTS IN GROUP II. TOXIN-ANTITOXIN.



To determine the possible late development of immunity, we retested (see Table 6) with the Schick reaction sixteen cases of this group from one to one and one-half years after the injections. Five of those who had shown early antitoxin production at the time of discharge from the hospital, still gave a negative Schick test. Of the eleven who had failed to give an early response to immunization, six now gave a negative, four a very faint and only one still gave a positive Schick reaction.

TABLE 7. EARLY RESULTS IN GROUP III. TOX.-ANTIT. WITH K. L. VACCINE.



In Group III (see Table 7), 158 patients were selected, who gave a positive Schick reaction. They were immunized with a mixture of toxin-antitoxin and a vaccine made of killed (57° C. for 45 minutes) virulent diphtheria bacilli. Three to four subcutaneous injections were given at intervals of three to four days, each injection consisting of 1 cc. of toxin-antitoxin and 1,000,000,000 bacteria. Slight local and general reactions were noted in about one half of the injected individuals. In this group our early results were better. Of 158 patients who were immunized, fifty-six, or 35.5 per cent., produced enough antitoxin within four weeks to give a negative Schick reaction, and nine, or six per cent., a very faint reaction. Of those who developed little or no antitoxin, eighty-three, or fifty-two per cent., showed a moderately positive Schick reaction, and ten, or 6.5 per cent., a strongly positive reaction. Among the ten who failed to react completely, four developed clinical diphtheria.

To note any later development of immunity we followed up to their homes, and retested two to five months after the injections, fifty cases of this

TABLE 8. EARLY AND LATE RESULTS IN GROUP III. TOX.-ANTIT. WITH K. L. VACCINE.

	50 +				
Within four weeks	10 -	36 +			4 +
2-5 months later	10 -	26 -	4 +	6 +	4 -

group (see Table 8). Ten of the patients who had produced a sufficient amount of antitoxin within four weeks after the injections to give a negative Schick test, still showed a lasting immunity. Of the forty who had developed little or no antitoxin within four weeks, thirty now gave a negative Schick reaction, four a very faint one, while in six the reaction was still moderately positive. Grouping together the early and the late successful results in this series, we find that forty out of fifty susceptible individuals had become immune and showed a lasting antitoxin development after the injections of toxin-antitoxin. Of the remaining ten, four showed a trace of antitoxin, while six gave a reaction which was still positive, although it was less marked than the original Schick test.

One year ago we also immunized actively with toxin-antitoxin, a series of sixteen normal children (Group IV, see Table 9), who had given a positive Schick reaction. Only four, or twenty-five per cent., showed a sufficient early response to the immunization to give a negative Schick reaction within four weeks after the injections. When re-tested four and eight months later,

TABLE 9. EARLY AND LATE RESULTS IN GROUP IV (NORMAL CHILDREN). TOXIN-ANTITOXIN.

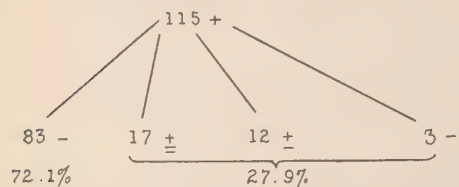
	16 +			
Within four weeks	4 -	10 +		2 +
Four months later	4 -	5 -	5 +	2 -
Eight months later	4 -	5 -	4 -	1 +

these four still gave a negative reaction, indicating probably a lasting immunization. Ten of the children who had failed to give rise to an early production of antitoxin, showed now the following interesting results: At the end of four months, five of the children had now become immune and gave a negative Schick test, while the other five were still positive. At the end of eight months, nine of the ten were immune, and only one still gave a positive reaction. Two of the sixteen children had given a partial early response, as shown by a faint Schick test. At the end of four months they were both completely immunized.

In one institution (Group V, see Table 10) we immunized with a slightly toxic mixture of toxin-antitoxin, 115 normal children from 4-16 years of age, who gave a positive Schick reaction. Of these children, 90 received three injections, and 25 received two injections of toxin-antitoxin. The dose was 1 cc. injected subcutaneously and repeated at intervals

of seven days. When the first retest was made 26 days after the last injection, or 40 days after the first injection, we obtained the following very interesting and encouraging results:

TABLE 10. RESULTS IN GROUP V.
TOXIN-ANTITOXIN.



40 days after first injection, or 27 days after last injection.

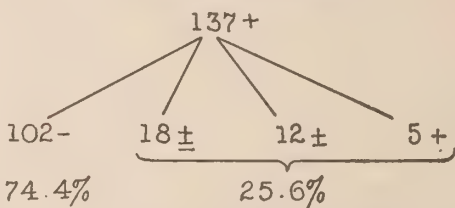
This group shows that fully 72.1 per cent. of children, who had given a positive Schick reaction before the injections, had become actively immunized within a relatively short time after the first injection of toxin-antitoxin.

Finally, in one institution (Group VI, see Table 11) of 558 boys varying in age from eight to eighteen years, 152, or 27.2 per cent., were found to give a positive Schick reaction and were actively immunized with three injections of a slightly toxic mixture of diphtheria toxin-antitoxin. The injections were given subcutaneously and repeated at intervals of seven days. The local reactions were generally mild, in some a little more marked in character. They consisted of local redness, induration and tenderness. In about 20 per cent. there was temperature of from 100° to 102° F. for twenty-four to forty-eight hours following the injection. In a few the temperature was slightly higher.

Of the 152 boys, 137 were retested forty-six days after the first injection

or thirty-two days after the last injection. The table shows the following strikingly good results:

TABLE 11. RESULTS IN GROUP VI.
TOXIN-ANTITOXIN.



46 days after first injection or 32 days after last injection.

This group shows that fully 74.4 per cent. have become actively immunized against diphtheria within six weeks after the beginning of the immunizing injections. By adding to these the 18 who gave a very faint Schick reaction at the retest, we have 120 out of 137, or 87.5 per cent., who may be considered to have become protected against diphtheria for a period of several years, and possibly for life.

As controls we had a group of six children who had received antitoxin only a year ago. At the end of eight months, five of the children still gave a positive Schick reaction, while one had now become negative.

Another group of cases that may serve as a control are twenty children who had received vaccines only, free of toxin, made from the diphtheria bacillus. Retested from five to eight months after the injections, we found fourteen who still gave a positive Schick reaction and six who had now become negative.

Active immunization, therefore, with mixtures of diphtheria toxin and antitoxin is successful and is applicable on a large scale where no immediate protection is required. Our results show that a large majority of susceptible individuals develop an active immunity between 30 and 60 days after the first injection of toxin-antitoxin, while only 25-30 per cent. become immune within the first 4 weeks after the primary injection. In such individuals who are exposed to diphtheria, and in immediate danger, a combined active and passive immunization is advisable.

ACTIVE IMMUNIZATION BY MEANS OF KILLED CULTURES OF DIPHTHERIA BACILLI.

Our next attempt was to immunize 210 scarlet fever patients, who gave a positive Schick test and were exposed to diphtheria, with vaccines only made from the Klebs-Löffler bacillus. Three to five injections each of 2,000,000,000 bacteria were given at intervals of four to five days. Slight or moderate local reactions were generally noted, occasionally associated with a slight rise in temperature.

Of the 210 patients that were thus treated, eighteen developed clinical diphtheria—Tonsillar, eight; nasal, nine; laryngeal, one.

After one vaccine injection in fourteen cases immunized, four developed diphtheria.

After two vaccine injections in fifteen cases immunized, four developed diphtheria.

After three vaccine injections in nineteen cases immunized, four developed diphtheria.

After four vaccine injections in twenty-eight cases immunized, three developed diphtheria.

After five vaccine injections in 134 cases immunized, three developed diphtheria.

Thirty of the remaining patients showed positive throat cultures with virulent bacilli, but had no clinical symptoms.

These results with the vaccine alone are rather discouraging, especially in view of the claims made by several investigators of the therapeutic value of such vaccines in carriers. Not only did we fail with these vaccines in ridding carriers of their organisms, but we even failed to immunize about one quarter of the injected individuals against becoming carriers or developing clinical symptoms.

In reviewing then the results of our investigations on immunity and some of the more important applications of the Schick reaction we have to emphasize:

(1) The great reliability of the Schick test, when the toxin is of proper strength and the method of employing it is correct, in showing the presence or absence of antitoxic immunity to diphtheria. A negative reaction obtained after the age of two or three years indicates that the individual is protected, probably indefinitely, against the disease. The great majority of positive reactions in children are true reactions and indicate an absence of antitoxin, and therefore, unless other antibodies are present, a susceptibility to diphtheria. Among adults the pseudo-reaction is seen in a certain proportion of individuals, but

this reaction can usually be distinguished clinically from the true reaction. The two reactions may be found combined in the same individual: in such cases the pseudo-reaction will disappear in three to four days leaving a distinct circumscribed area of sealing pigmentation due to the positive reaction. The later injection of some of the same lot of toxin either heated to 75° C. for five minutes or after neutralization with antitoxin as a control will help to indicate the pseudo-reactions.

(2) The great value of the test in determining clinically the efficiency of the immunization of susceptible individuals, who have been injected with mixtures of diphtheria toxin and antitoxin. For this purpose only positive Schick cases should be chosen, and after the injections, they should be tested one, three, six, and twelve months later to determine whether a sufficient amount of antitoxin had developed early or late to inhibit the Schick reaction, showing thereby the production of an active immunity to diphtheria.

(3) The Schick test is of a great help in clearing up the diagnosis of clinically doubtful cases of diphtheria. With a purulent or sanious nasal discharge showing the Klebs-Löffler bacillus it is difficult to decide whether the case is a carrier or a beginning diphtheria. A negative reaction excludes diphtheria, while a positive Schick reaction leaves the diagnosis of diphtheria still a probability. A case of tonsillitis due to streptococcus in a carrier of diphtheria bacilli would, by the use of the culture alone, be thought to have diph-

theria and in danger of extension of the disease. A negative Schick reaction would indicate the case to be simply a carrier, and in no danger from the effects of the diphtheria poison.

(4) The Schick reaction has added further proof to the clinical and experimental observations that very toxic cases of diphtheria do better when given an early intravenous injection of antitoxin than when it is administered in any other way. It reveals the fact that an intravenous injection of antitoxin is able to partly neutralize toxin six hours after its absorption by the tissues and thus gives us hope in some of the late cases of diphtheria. The results with the Schick test will serve as a reminder that after contact with the tissues for more than a few hours the effect of the toxin can no longer be prevented; that a day, and, in fact, hours of delay in the administration of a therapeutic dose of antitoxin may mean not only the absorption but the final binding of a fatal dose of diphtheria toxin.

(5) The results obtained with the Schick test in families seem to indicate that besides infection with virulent diphtheria bacilli, other factors, possibly hereditary in nature, are concerned in the production of natural immunity to diphtheria. The absence of antitoxic immunity in more than 65 per cent. of individuals after an attack of diphtheria and in the majority of positive Schick cases within four weeks after treatment with mixtures of toxin and antitoxin shows that the tissues have never had, and have only slowly acquired, the ability to produce antitoxin.

(6) The Schick reaction can be applied with advantage in testing the patients, resident staff and nurses of contagious disease hospitals. By its use a considerable saving can be effected in antitoxin during outbreaks of diphtheria in institutions or in homes; it relieves of the fear of contagion and also avoids unnecessarily sensitizing about one half of the exposed individuals. It should be applied as a routine in both the measles and the scarlet fever pavilions of hospitals. By administering 1,000-2,000 units of antitoxin in positive Schick cases and reimmunizing the patients if they remain for more than three weeks in the hospital, we should be able to control the development of diphtheria during the convalescence from scarlet fever or measles.

(7) The immediate results following the injection of the toxin-anti-

toxin mixture have been somewhat disappointing but the later ones are quite encouraging.

In conclusion we believe that the good late results following the toxin-antitoxin injections and the ability now to recognize clinically those individuals who are susceptible to diphtheria, will arouse an interest in the more widespread use of an active immunization with mixtures of diphtheria toxin and antitoxin which will enable us to greatly lessen and, perhaps, finally eradicate the disease. Up to the present time, in spite of the use of antitoxin, the number of cases of diphtheria has but slightly diminished. The brilliant lowering of the death-rate has been due as stated by von Behring to the lessened mortality in the treated cases rather than to a decrease in the total number of cases of diphtheria.



THE COST OF WATER PURIFICATION AS AFFECTED BY THE WAR.

The prices of certain chemicals used in water purification have risen greatly on account of the war. The actual amount of chemicals used in water purification plants is insignificant from the standpoint of total consumption, and at present the difficulty of the situation consists in the fact that the water-works officials are at the mercy of the prices set by the needs of the manufacturers of explosives and of many industrial processes. The normal price of bleaching powder, for example, on the New York market, is about \$1.25 to \$1.35 per hundredweight, while the New York wholesale quotations, March 4, 1916, were from \$10.50 to \$12.50 per hundredweight. Fortunately the advance in cost of liquid chlorin has been much less (about double the normal rate), so that chlorin disinfection may still be inexpensively carried out. The Present prices of aluminum sulphate and copper

sulphate are from three to fourfold the normal. The cost of iron sulphate, on the other hand, has risen but little. The increased cost of aluminum sulphate, which is so commonly used as a coagulant in the mechanical filters, is probably the most serious item of this sort in water-works expenses. It is to be hoped that water-works officials will be on their guard against any tendency toward a lowering of the efficiency of purification because of the rise in operating expense. Here, if anywhere, the motto "safety first" has its place. Any saving effected in the quantity of chlorin or other chemicals used is trivial compared with the possible dangers of infection. The present chemical situation suggests at most the substitution of liquid chlorin for calcium hypochlorite, and where practicable, of lime or iron sulphate for aluminum sulphate.—*Journal of the American Medical Association.*

THE HEALTH OF DEPARTMENT STORE WOMEN IN NEW YORK CITY.

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Read before the Industrial Hygiene Section, American Public Health Association, Rochester, N. Y.,
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Doctor Mann's paper not only presents the specific problem indicated in the title, but also deals with some problems which are sure to command an increasing amount of attention on the part of health administrators, particularly the relationship between wages and health.

I BECAME interested in the health of department store women under the auspices of the Department Store Education Association, which was establishing a school of preparation for salesmanship in New York City, and as a part of this plan desired to find out something about the physical condition of saleswomen.

I have been almost exclusively engaged since early July, 1914, with the health problems of department store women and through this experience have come to certain conclusions which apply not only to this particular group of women but to the larger question of the health of women in industry.

During this period of time, I have made my observations in two of the large stores in New York and have had opportunity:

1st. To examine some 125 women employees physically and medically, an examination which included a history and statement as to their own point of view toward their habits and present conditions of life. This

examination occupied one hour per person.

2d. To have charge of the hospitals in both places and hence to observe the character of the trivial illnesses that reach the store physician.

3d. To examine the applicants for positions in one of the stores and discard the unfit.

4th. To give talks on hygiene to groups of women in both stores.

5th. To come in close personal contact with the women in the organization and supervision of gymnasium classes.

My results obtained from this intensive experience, with conclusions as to their significance, I shall try to condense within the ten minutes allotted me. But first I must clear the way by stating that I am not going to treat the question at all from the point of view of time missed or sick insurance. The large stores average about 3 per cent. daily absences, I am told. The loss from this cause is not a crippling one, though felt from time to time as a decided in-

convenience and in the long run amounting to a great deal. I shall also exclude from my discussion the problem of store sanitation. This is a serious feature of the health question in many stores, but did not happen to be of maximum import in the places where my observations were made. I come then to my findings which I have grouped under three heads:

1st. Results obtained from experience in the store hospital.

2d. From the examination of the cards of 1,500 applicants for positions in one of the large stores. About 150 of these examinations I made myself.

3d. Results obtained from the examination (physical and medical) of 125 saleswomen varying in age from 16 to 55 years.

1st. The usual method of the employers for caring for the health of their employees in a large store is through their own hospital. This is supposedly for emergency cases and is not intended or equipped as a rule to treat chronic illness. Few firms send doctors into the homes. Most of these store hospitals have a nurse in attendance all the time and a doctor from 3 to 18 hours a week. A varying number of cases are handled. One large store (2,000 employees) boasts that 150 a day use the hospital. If this number were actually ill, it would make a bad showing for the condition of employees in the store. Tabulating my own experience for three months in one store with a list of 2,000 employees, I found:

Total average per diem	26 persons
Cases, surgery (minor)	37 per cent.
	(real emergency)
Indigestion	7 per cent.
"Colds," nose and throat infections	17 per cent.
Headache	9 per cent.
Eyes and ears, symptoms	8 per cent.
Dysmenorrhœa	6 per cent.
Unclassified	16 per cent.

In the course of one month the hospital treats a number of cases equal to about 40 per cent. of the total employees and this represents a fraction of the illnesses in the store. Examining the symptoms more closely, we find that the trivial functional disturbances which might be eliminated by greater understanding and care of the body amount to from 40 to 45 per cent. These latter cases are attended to for the most part by a nurse who administers palliative remedies frequently without reference to any real diagnosis or with any authoritative advice.

In one store with which I was associated (the only store in New York that I know of where this is done), applicants for positions had been examined since the year 1913, a total number of 1,500. Of these applicants 12 per cent. of women and 15 per cent. of men had been rejected for organic incurable conditions—chiefly on the basis of heart and urinary findings. I will not take the time for greater detail. But the value of the initial physical examinations to employees and employer cannot be overestimated. Through them: *Physical fitness for type of job is determined.* A hyperthyroid case should not be an errand girl—or a heart case a floor

walker. The definitely unfit are weeded. This may seem at first to bear hard on the rejected person, but it is no advantage for a sick man to try to compete with the well, and competition is keen in a department store. I could give many examples where this worked decidedly to the disadvantage of the sub-normal. Also it should not be regarded as the responsibility of industry to carry the definitely sick. But these examinations should be made the basis of physical improvement for those who are accepted. This can be done by the establishment of a probation class made up of those who are organically sound but defective in remediable ways.

With this reform in the system of examination of applicants, it can be made of invaluable service to the employer or employees.

Most of my information regarding the health of department store women has come from close personal contact with the women themselves in making the physical examinations and in organizing and supervising gymnasium work. No one has emphasized in previous meetings the loss in efficiency due to the chronic sub-normal condition of the worker and I wonder if this is not more marked in the case of women than men. It cannot be measured in any way; but among women employees the various pains and weaknesses from which they suffer must mean to a firm a far greater source of waste than their actual absences. Department store women are not infrequently brought to the hospital in a fainting condition, be-

cause they would continue conscientiously to work until they dropped. My experience has brought me in contact with no man carried to the hospital for similar reasons—though there are more men in a department store than one would think from a casual passing through.

The results obtained from the first 100 saleswomen (average age 26) were as follows:

ON THE SYMPTOM SIDE.

	Per cent.
Headaches—periodic, recurring	55
Gastro-intestinal disturbances, indigestion	
—stomach or intestinal	57
Menstrual disturbances	49
Leucorrhœa	29

In addition to these more common complaints many spoke of:

Frequent colds,
Chronic catarrh,
Over-fatigue at close of day, lassitude.

Nervousness was complained of much. It was hard to find out just what the women meant by this, but by close questioning I decided that the feeling that was most prominent in their connotation of the word was "worry" over possible loss of job, daily amount of sales, loss of a customer or a sale through some error in judgment. The person who "worries" is a nervous person.

On physical examination, the most striking findings were:

	Per cent.
Teeth needing attention	30
Heart murmurs—organic and functional	14
Feet—flat	7
Weakened longitudinal arch	28
Transverse arch gone (probably from constant standing in high-heeled shoes)	92

Backs:	Per cent.
Good straight backs.....	8
Fair backs.....	7
Curvatures (ant-post or lateral).....	85

Cases were also discovered of

Varicose veins,
Anemia,
Discharging ear,
Ulcer of stomach,
Strained eyes,
Chronic appendicitis,
Malnutrition,
Nasal obstruction,
Acne,
Etc.

Total number who could be benefited in health by medical advice—89 per cent. Yet only about 4 per cent. were under a doctor's care at all.

It is dangerous, I know, to give impressions where figures cannot be obtained, but after a year's experience with college women, followed immediately by this year's experience with department store women and after having watched carefully the gymnasium work of both groups, I feel justified in saying that the latter tend to grow amazingly rigid in their occupation and lack coördination to an astonishing degree, even in the larger motions of the body. The department store woman also ages prematurely. Women of from 40 to 50 are oftentimes wrinkled and bent ten years ahead of time.

The habits of life would show that most of them sleep well, but that few understand the principles of wholesome eating and few get enough recreation (only 10 per cent. could dance the new dances); about the same per cent. got any regular exercise outside their work. Many

have serious home responsibilities that cut them off from spending money for anything except the absolute necessities of life, and compel them to devote their evenings to domestic work.

I should say in summary that about 11 per cent. can be said in any true sense to be flourishing in their occupation.

In general, then, my conclusions would be that the department store woman, judged by any right standard of good health, is a pretty poor specimen—and I made my observations in two of the best stores in New York City. I have as yet developed no comparative evidence, however, to show that her condition is due with any certainty to the nature of her occupation rather than to home conditions (dependent upon low salary) and abuse of health. It is true a very high per cent. have functional curvatures of the spine, but so have an ever increasingly high per cent. of school children and college women. One could develop a plausible theory, on the basis of those curvatures, about the evil of the 8-hour standing position for women, but it doesn't altogether work. The women, themselves, do not complain of the long hours of standing. The menstrual disturbances are not so frequent as among college women. But, however difficult and impossible in a scientific way at present to connect up any special weakness of physique with any special industrial hazard for the department store girl, it is clear that for some reason or other, those engaged in this industry are in a physical

condition that is altogether inferior to what we have a right to demand of normal American womanhood and is hardly compatible with healthy child-bearing. The health of the department store woman (as of woman in industry) raises immediately the whole social question of the adaptability of woman to an industrial environment, though very likely these women would be found no worse off than a random group of married women living at home. Nevertheless it is clear enough that something might easily be done to improve their condition in the stores.

Department store managers, recognizing the need, have already started to look after their employees through their hospital. But this work has been merely palliative and not constructive. Undoubtedly, the most satisfactory way to improve the standard of health would be by raising wages, shortening hours or eliminating the excessive competition which brings it about, that ten girls are clamoring for every one job open to them and then fearing constantly the loss of the job they have secured.

But these methods are beyond the doctor's precinct at present. Besides which, even if life were made easier for her, I doubt whether in her present state of ignorance about her health and attitude toward it, her physical condition would be much improved. What is needed is a campaign of education. First and foremost department store women must be taught the principle of wholesome eating, the importance of exercise, and sane clothing, the effect of mind

and emotion on body and this teaching must be dynamic. It must make them want to apply the facts learned. Much of our teaching fails in just this way. It does not convince either of the importance or desirability of health measures. This teaching presupposes, however, opportunity for right exercise. We cannot tell girls they ought to exercise and provide no place. The department store girl is engaged in an inactive occupation. She walks about two miles a day as registered by a pedometer and stands the rest of the time in tightly fitting poorly constructed corsets and high-heeled shoes. As a rule, she has no knowledge of correct posture. A woman, who must stand all day should be specially prepared in this respect. She should be given opportunity for gymnasium exercise, or its equivalent. But the ordinary training to be successful in the improvement of health must be founded on the results of physical examinations.

We now have the three things that will make on the specifically health side for improvement in physical condition of department store women—education, gymnasium, or equivalent opportunities which should include training in correct standing position, periodic physical examinations. How little the introduction of this régime would add to the store's expense! Yet the increase of the efficiency of the women would be inestimably great.

But back of all these practical measures lies what seems to me to be the greatest failing of all. Our—and when I say "our" I mean the medical

profession's—standard of the health of women is low. We must insist that these petty ills are not necessary under a rightly conditioned life. Starting from this premise, with the intelligent coöperation of the woman,

herself, we should condition industry to fit her needs so that the average number of years spent in a store or factory before marriage will in no way harm her or jeopardize the coming generation.



THE RECENT MEETING OF THE PUBLIC WELFARE ASSOCIATION IN TORONTO.

The meeting of the associated societies, the Children's Aid, Feeble-Minded and Charities and Corrections, held in Toronto, illustrated how the many unobtrusive social workers in Canada are maintaining their practical interest in those public problems which existed before and will continue after the war. The executive officers deemed it advisable not to allow a second year to pass without an annual convention and the Toronto Committee arranged a practical programme and succeeded in having a good representation from Ontario cities and towns and a fair sprinkling from the other Provinces. Separate executive meetings of the three societies were held; but the programme sessions included the attending members from each. Intense interest was shown during the discussion of the subjects which were included under three chief topics:

First—How best to deal with the child in infancy, before school age, during school age and after leaving in order to make good strong Canadians of them.

Second—How shall we deal with the backward in our schools and the feeble-minded and young delinquents of society.

Third—How can immigrants be best selected and how, when admitted to Canada, shall we assist them in becoming good Canadians?

Officials of the several governments, city officials, school officials, newspaper editors and social workers from every organization were present to discuss the various subjects. The remarkable evolution of public opinion in Canada was shown in the practical unanimity of views expressed; that where so many social evils are preventable, society must find ways to prevent them. Hence the matter has now entered upon the practical stage of determining,

"What methods are the best and most practical and how are the various communities to carry them into effect?"

A special exhibit was arranged by the Toronto Committee of the work done by the feeble-minded in the several public institutions and by the backward in public schools and probably none excited more interest than some of the remarkable work done by the backward classes under the supervision of the Ottawa Public School Board. Probably few in Ottawa know what the two ladies especially devoting themselves to this class of work have taught their pupils; but our citizens may be assured that they will have an opportunity at the exhibit which will be held next year of seeing what wise, kindly and trained workers can do for unfortunate backward pupils. With a view to bringing the educational and practical needs of these problems before the people of Canada, the several societies which are now uniting under "The Association of Public Welfare" determined that it would be in the highest public interest to arrange to hold the next annual meeting in Ottawa and to the end of interesting Ottawa social workers elected Dr. P. H. Bryce, chief medical officer of the Interior Department, as president during the coming year. A meeting will shortly be called of social workers in Ottawa to select the members of the local committee; while it is the ambition of the members of the Ottawa Committee who were present in Toronto as well as all social workers in the city to advance the social programme here by seeing secured, by the City Council, an area of land for a prison farm and also for a home for feeble-minded, both of which classes are at present charges upon the city.

P. H. B.

HEART DISEASE AND ITS INDUSTRIAL RELATIONS.

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Read before the Industrial Hygiene Section of the American Public Health Association, Rochester, N. Y.,
September 9, 1915.

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ALTHOUGH diseases of the heart are not of industrial or occupational origin, except possibly in rare instances, their frequent occurrence among the working classes constitutes an economic and sociological problem of far-reaching importance. In view of the magnitude of the problem, it is not a little surprising that as yet it has attracted almost no public attention. Undoubtedly this has been due to the fact that little is known by the public of the frequency of these diseases but especially to the wide-spread belief that heart disease condemns its victims to a life of invalidism and an early death.

It is well to state here that the term "heart disease" as used throughout this article implies chronic cardiac valvular disease, that is, mechanical defects of the valves of the heart.

The existence of heart disease in the workman concerns not only the person affected but his employer, and may be of grave concern to the public.

The Relation of Heart Disease in the Workingman to the Public.—The employment of men affected with heart

disease in occupations involving the custody of human life constitutes a serious menace to public safety. There are many such occupations, but I need mention only those of locomotive engineers, motormen on trolley and subway cars, and chauffeurs.

While sudden death is not common in many forms of heart disease, except in the later stages, violent exertion is likely to result in sudden incapacity and public safety demands that men employed in occupations such as those mentioned above should possess functionally perfect hearts. It need scarcely be added that applicants for employment in such occupations should be thoroughly examined and that men with lesions of the heart should be disbarred.

The Relation of Employers to Heart Disease in Employees.—From a purely economic standpoint employers may be affected by heart disease in their employees in various ways.

Heart disease impairs the efficiency of the employee and reduces his output. If the occupation is an arduous one, he is ultimately rendered unfit, and the training of another workman may involve economic loss. Again, the

sudden collapse of an employee may result in damage to complicated machinery and injury to fellow workmen, as well as to the man himself. Under the compensation laws the pecuniary losses which the employer would have to bear might be very heavy.

The Effect of Heart Disease on the Workingman.—As regards the workingman himself, heart disease sooner or later impairs his efficiency, reduces his earning capacity, and shortens his expectation of life. Moreover, it causes untold suffering and often plunges his family into want.

Ordinarily when a person with heart disease applies for treatment for this disease much damage has been done to the myocardium. Inquiry shows in nearly every instance that he has been engaged in an occupation requiring more physical exertion than his already overburdened heart is capable of bearing and the break in compensation has been inevitable.

To the advice that a change of occupation be made on leaving the hospital, the responses are almost invariably the same: "I am a laboring man and can obtain no lighter work," "I know no other trade," or "I shall try, but my family is in want and I must take what work I can get." And they return to their former occupations with the result that is pointed out to them—another break in compensation, readmission to the hospital, and enforced idleness. Each succeeding break in compensation is more difficult to repair, and it has been said with some foundation of truth that total incapacity or death follows the third serious break.

Probably only those connected with large general hospitals are fully aware of the frequency of heart disease among the working classes and of the amount of suffering and privation that it causes. In Bellevue and Allied Hospitals in 1913 there were 839 cases of heart disease, including 233 deaths, in a total of 46,638 patients or 1.8 percent. This does not include infective endocarditis, diseases of the myocardium, pericarditis, other diseases complicated by heart disease, or the secondary changes in the heart in patients with nephritis. In Bellevue Hospital alone there were 564 patients. These patients required 9,754 days of hospital care. This represents twenty-six years of suffering from heart disease in one hospital, in one year! The loss in wages, figured at only \$1.50 a day, amounted to \$14,631, and the cost to the city for maintenance was \$17,069, a total economic loss of \$31,700. And statistics show that the general mortality from heart disease is steadily increasing.

In view of facts like these, the industrial relations of heart disease are assuming greater importance every year; every year the need of an organized attack upon the problem becomes more pressing.

The question of most immediate importance is this, Can the status of the workingman with heart disease be improved?

Fortunately the question can be answered in the affirmative. Not only does the remedy exist but it has been applied on a limited scale in New York City in the Bellevue and Sharon experiments. A brief account of these may be given.

The Bellevue Hospital Experiment.—*

A special class for patients with heart disease was organized in the dispensary in 1911 under the auspices of the Social Service Bureau. The success of the experiment has been due to the energy and devotion of Dr. H. V. Guile, physician in charge, and Miss Florence M. Campbell, social service worker.

In the words of Miss Tyng, the object in organizing the class was "to see just what could be done by medical and social aftercare of discharged cardiac patients to prevent their return to hospital, to prevent unnecessary suffering, and to restore the more hopeful ones to a measure of economic usefulness."

To November 1, 1914, 232 patients had been in attendance. The class, which is held in the evening, is now so overcrowded that it is rarely over before half-past eleven or so. The fact that patients are willing to wait so long for their turn is sufficient testimony of the estimate they place upon its value to them.

The help which the class has rendered may be illustrated as follows:

Six of the patients had spent 251 days in hospital the year before coming to the class; the year after, not one of them was in hospital for even one day. The loss in wages, estimated at only \$1.50 per day, was \$376.00, the cost to the hospital for maintenance was \$439.00, an economic gain of \$817.00.

The occupations of twenty-seven patients have been changed or adapted to the requirements of their hearts.

The Sharon Experiment was conceived upon different lines. The central idea was that of a trade school wherein suitable industrial training could be combined with the convalescent care of patients whose hearts had broken down.

The school was established under the auspices of the New York Conference on Hospital Social Service. The interest and efforts of Dr. L. A. Conner and Dr. N. Gilbert Seymour in making the experiment a possibility should be specially mentioned.

Much difficulty was experienced in finding a trade which satisfied the requirements of the experiment. Through the recommendation of Dr. Herbert J. Hall, of Marblehead, Mass., cement work was finally decided upon. This consists in the manufacture from hand moulds of such wares as ornamental flower-pots, window boxes, garden bowls, etc. The school is indebted to Dr. Hall for permission to use the method † which he developed, and for the helpful advice which he has so freely and obligingly given.

It would lead too far from the main discussion to refer to the obstacles which arose during the course of the experiment and how they were overcome, or to the statistics of the patients. It may be mentioned, however, that it was soon found necessary to open workshops where the "graduates" of the school could find employment and where the wares could be put on sale.

These two experiments, limited as they have been in scope, illustrate the

* For a full account of the work, the reader should refer to the survey by Miss Katharine Tyng in the Report of the Social Service Bureau of Bellevue and Allied Hospitals for 1914.

† It should be stated that the method is protected by patent.

useful possibilities which lie before an organized attack on the problem of heart disease in the working classes, and the time appears ripe for launching a definite campaign.

The object of such a campaign, for the present at least, would not be reduction in the frequency of heart disease—that is a purely medical problem which still awaits solution—its objects would be rather the prevention of cardiac breakdowns with their attendant misery and want, the restoration of individuals to economic usefulness, and the prolongation of life.

The methods to be pursued in the accomplishment of these aims must of necessity be of gradual development, yet it is clear that they must include the early discovery of the disease, the education of the public in the significance of the disease and the limitation it imposes, the supervision of persons suffering from heart disease, and change of occupation when necessary.

Early Discovery.—Especial effort should be directed toward the discovery of heart disease before the development of symptoms, for, as already stated, the appearance of symptoms indicates more or less serious injury to the myocardium. Early discovery can only be accomplished through frequent physical examinations. They should be begun in childhood and be repeated yearly. It would appear feasible for health authorities to require a physical examination of each child in the public schools as is done now in New York. In like manner physical examination could be required of older children when they apply for

certificates that they are of working age.

In the case of adults it would be well for every person to have himself examined once a year, whether ill or not. Physical examination of applicants for work in compressed air caissons is now required by law in New York. In my opinion the law should be extended to all workers. The method by which this could be put into operation and the expense divided is difficult to formulate. My own belief is in accordance with that of Dr. John B. Andrews, that the best plan will be the establishment of compulsory health insurance for the working classes. This would divide the expense of physical examinations equitably among workmen, employers, and the state. Aside from the question of public policy, the participation of the state would be justified because of the reduction in hospital charges which in my opinion would follow.

In this connection I may refer to the strong and increasing opposition in labor circles to the demand of employers for physical examination of the workingman as a condition of employment. The American Federation of Labor placed itself on record last year at its meeting in Philadelphia as opposed to the examination of workers except in trades having extraordinary health hazards, and the Ohio State Federation of Labor passed a resolution calling for legislation which would make it a penal offense for an employer to require physical examination of a worker precedent to employment.

The opposition of the individual workingman is easy to understand:

he may lose his "job" if he is found to have heart disease. Yet if the occupation in which he is engaged is an arduous one, this very fact may be the means of prolonging his usefulness and lengthening his life. The opposition of the labor union is more difficult to understand. It can only be interpreted to mean that those who direct labor's policies do not realize the amount of suffering and want which result from heart disease because the knowledge of its existence comes too late.

My opinion in favor of physical examination has been formed at the bedside of men who, through ignorance of their handicap and the limitations it imposes, have fallen in the struggle for existence. Propped up in bed, unable to sleep night or day, they fight for breath itself. And the most pitiful part of these tragedies is, they might have been prevented.

Education.—The practice, fortunately less common now, of concealing the presence of heart disease from the person most interested, namely, the victim of the disease, is to be condemned unreservedly. He should be informed of its existence as soon as the disease is discovered in order that he may coöperate intelligently and effectively in the attempt to prevent, or at least postpone, a breakdown of the heart. At the same time, he should be reassured; he should be told that heart disease is not the dread affliction that once it was supposed to be.

The next most important thing for the individual with heart disease is a knowledge of his limitations—that is, a knowledge of the amount of physical

strain his heart will bear without injury. This, of course, will vary with different hearts and no one can estimate it without subjecting the heart to careful tests. But he can be taught to recognize the symptoms which indicate that he is overtaking his heart. He should be told how to regulate his life, and a list of occupations which he may safely follow should be given to him.

The greatest obstacle which presents itself at present is finding means of bringing this information to the persons who need it. Some of the ways which suggest themselves are the following:

A nation-wide publicity campaign in the medical, lay, and trade press—perhaps a special journal could be founded for the purpose.

The distribution of pamphlets and leaflets containing the necessary facts, the distribution to be effected by the public health authorities, the public employment bureaus, the welfare departments of corporations, and special dispensaries.

Supervision.—The need of careful medical supervision of persons with heart disease has long been recognized. This is especially true of persons whose hearts are on the point of breaking down. If they are engaged in laborious occupations, they should be advised to seek another. An exceedingly important part of the supervision consists in investigation of the home conditions of the patients—the "follow-up" work of the social service departments of hospitals and dispensaries. The amount of assistance which the social service worker can render is indicated in Miss Tyng's report.

Adequate supervision can probably best be maintained through dispensary classes. The rapid growth of the Bellevue class demonstrates the need of many like it. Any hospital which conducts a general dispensary could establish such a class at little or no additional cost. It should be possible also to organize such classes in connection with the welfare work of corporations. I believe that some corporations now conduct dispensaries for other purposes.

The existence of these classes should be widely heralded and they should be made centers for the distribution of information concerning the care of the heart.

Change of Occupation.—Persons in comfortable circumstances afflicted with heart disease, who are able to seek competent medical advice and to follow it, often lead long and useful lives in sedentary occupations, and when death does come it is not infrequently due to some intercurrent disease, such as pneumonia. Such facts show that it is not heart disease itself which incapacitates the individual but rather the failure to adapt one's life to his handicap.

The earlier a person recognizes his limitations and regulates his life in accordance with them, the greater the prospect of preventing, or at least postponing, decompensation of the heart. In the working classes, especially, this can often be accomplished only by change of occupation. At present it

is easier to suggest than to effect this change. In fact, this is one of the greatest problems before the projected campaign against heart disease, but it is capable of solution.

Individuals may be able to change their occupations without aid. The interest of employers may be enlisted through the efforts of social service workers or through the publicity campaign. The public employment bureaus may be charged with the duty of selecting or suggesting proper occupations to persons with heart disease. More ambitious programs contemplate the foundation of trade schools such as that at Sharon. Funds might be made available also for instruction in trade schools already in existence and for rendering financial assistance where this is necessary during the period of unproductiveness.

Summary.—Heart disease is common among workingmen, and statistics show that the general mortality from the disease is increasing. The economic loss in Bellevue Hospital for one year was \$30,000. The suffering and privation which heart disease causes comes largely through ignorance of its existence or inability to adapt one's life to the limitations which it imposes. The majority of workingmen who have heart disease are engaged in unsuitable occupations.

The facts presented indicate the need of an organized attack upon the problem of heart disease in the working classes.

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NEW YORK'S CELEBRATION OF A SEMI-CENTENARY OF PUBLIC HEALTH.

Seldom have the forces engaged in Public Health work presented a stronger front or better illustrated their victories than on the evening of March 9, when the New York Department of Health celebrated the jubilee of the organization of the Board of Health of that in the city in 1866. In a neat booklet presented to each guest prepared by Doctor Bolduan, Director of the Bureau of Public Health Education of the Department, there was set forth the chronological history of the work of the Board, and, *mirabile dictu*, the draughtsman of the first Health Ordinance, Dr. Stephen Smith, was present and in clear tones read a succinct statement of the interesting events of that now long past time. Alongside of Doctor Smith was Professor C. F. Chandler, the first chemist of the Board and its chairman from 1873 onward for some years, while Doctor Jacobi supported his colleagues of nearly fifty years ago. In order to show a natural pride in the professional achievements of their colleagues some three hundred medical men of the city and district were present at the gathering and were represented in the speeches by Dr. W. B. James, president of the New York Academy of Medicine. The United States Public Health Service sent Dr. J. W. Trask, and Canada, Dr. P. H. Bryce of Ottawa, of the Interior Department, to bear the greetings of the two countries to the Board of Health of the Metropolitan City, which stands a sentinel at the chief gateway of the Continent.

Mayor Mitchel of New York City told admirably how greatly appreciated its Board of Health was by the people of New York and guaranteed his official support to its work as well as the extension of its methods to other branches of

the civic service, both as regards efficiency and economy. The Hon. Henry Bruère, City Chamberlain, supplemented the Mayor's remarks and indicated the supreme importance of the socializing benefits resulting from the diffusion of a knowledge of public health in its personal relations.

Dr. Haven Emerson, the Commissioner of Health, made a model chairman and fitted the successive speakers into their places splendidly in the symposium with a few well chosen words. Professor William H. Welch spoke most appropriately in his references not only to what had been done in New York during the long years he had known its Public Health work, but also of the place New York had taken as exponent of scientific work to the whole continent and to the world. He paid a worthy tribute to Dr. Hermann Biggs as being perhaps more than any other person both the proponent and exponent of the application of the experimental method of science to Public Health. Doctor Biggs in his turn took occasion to present a brief written historical résumé of the advances in exact methods in the Board's work, instituted at the time of his first association with the Board in 1892, the year of the Hamburg cholera epidemic. This work on cholera was followed by inoculation work with milk from diseased animals instituted by Dr. E. J. Lederle, and by the medical discussions leading to the compulsory notification of tuberculosis in 1896 with all that has followed in the preparation of serums and their generous application to the needs of the poor of the city. Perhaps nothing gave a more piquant meaning to all that was said that evening than the diagram in the brochure illustrating the decline in the city's death-rate which gave point to the quotation by one of the speakers, illustrating Sir Christopher Wren's work engraved on St. Paul's Cathedral, "*Si monumentum quaeris circumspice*"; while the figures may also be accepted as confirming Doctor Bigg's motto stamped on all the Board's documents—

"Public Health is purchasable. Within natural limitations a community can determine its own death-rate."

As Professor Welch said, Public Health has made more remarkable progress, won greater victories for science and extended her beneficent influences farther and to a greater degree to the millions of the world's population than has science in any other field of her wonderful advances. All present went away encouraged and delighted to have been there.



FELLOWSHIP FOR PUBLIC HEALTH MEN.

The Harvard Medical School, in coöperation with the Boston Dispensary, offers a Fellowship with an annual stipend of \$750, to a man who would devote half of his time to the care of sick in their homes in an assigned district in the city of Boston, and the remaining half of his time to study or research in the Department of Preventive Medicine, or in the School for Health Officers of the Harvard Medical School.

An appointment might be awarded for two years to an applicant, who would thus be enabled to complete a course of study in two years instead of in one, or to pursue research, while gaining at the same time a valuable practical experience in clinical and health work in a district.

Applicants must be graduates in medicine.

Applications should be made to Dr. Milton J. Rosenau, Harvard Medical School, Longwood Avenue, Boston.

THE CLASSIFICATION OF HAZARDOUS OCCUPATIONS.

E. R. HAYHURST, A. M., M. D.,
*Director, Division of Industrial Hygiene, Ohio State Board of Health,
Columbus, Ohio.*

Read before the Vital Statistics Section of the American Public Health Association, Rochester, N. Y., September 8, 1915.

In this paper Doctor Hayhurst describes the six classifications for hazardous occupations which were employed in a survey made in Ohio. He also explains, by text and diagram, the process of analyzing, upon a standard formula, the hazard of an individual case.

SCOPE.

AS a premise, it is safe to assume that all occupations are associated with hazards both of accident and health types. I shall limit myself exclusively to a discussion of the classification of occupations hazardous to health, and in this I shall not attempt to list specific hazardous occupations by naming them. A search for occupations lacking in health hazards was made by Teleky in 1913 and he reported two phases of horticulture which he considered as practically free from health hazards. Similarly, in California, in 1914, Dr. Philip King Brown arrived at the conclusion that but one form of occupation, and, odd to say, pottery working (of course carefully supervised) could be considered safe for the employment of the convalescent tuberculous patient.

STANDARDS.

The basic factors for a classification of this kind are but imperfectly understood or agreed upon. The standards which we have for healthy individuals

are general, such as the ability to eat, sleep, work, maintain weight, appetite, healthy desires and ambitions, and the like. The standards for a normal environment are those which Nature offers when we find her at her best, whatever this "best" may be.

As is well known, no attempted classification of occupations alone has been satisfactory from divergent viewpoints. The recent appearance of the "Index to Occupations, Alphabetical and Classified" by the Bureau of Census has been a long step in advance. Some of this, however, is based upon rather arbitrary deductions and arrangements and, from the sanitarian's point of view, gives only partial assistance in arranging occupations according to morbidity and mortality experiences. But its mass of information is very utilizable.

THE WORKER.

In the first place, the human side of the subjection to health hazards depends upon three factors, provided an average normal adult is taken for consideration: First, no hazard really

exists unless the exposure results in influencing physiologic functions (hence steadiness or changeableness are factors); second, the hazard must be capable, by its continued oppression, of surpassing the powers of physiologic toleration (and so permitting toxic substances, either of extrinsic or intrinsic origin, to produce disease or pathology); third, the bodily powers of adaption in regard to certain forms of hazards, particularly fatigue and mechanical irritants, must be taken into consideration (and a sharp distinction must be made between hazards to which the bodily functions may adapt themselves and hazards for which there is no evidence that adaptation is possible in a physiologic sense—such, for instance, as subjection to non-biologic poisons, abnormal light effects, humidity effects, temperature effects, and the like).

THE ABNORMAL WORKER.

I shall not consider here the classification of workers suffering from physical abnormalities and diseases which incapacitate them in various ways for working and to whom normal work may prove hazardous. Suffice it to say that a physical examination upon employment, or upon change to a new form of employment, will virtually establish any abnormal risks which are to be assumed.

THE NORMAL WORKER.

For normal persons, however, there should be accepted at least two classes—youths and adults. It is also well in some instances to divide adults by

sexes. Hence, we see there are three physiologic standards to take into consideration. Of these three, youths are invariably much greater risks than adults because of the ultimate effects of hazards (extrinsic and intrinsic poisons) upon the growing organism and the development of vital reserve capacities. Such circumstances undoubtedly account for a large part of the tuberculous processes and nervous and mental affections which first appear in occupied young adults. It is probable that the heart and eliminative organs are relatively more resistant at this period of life. To meet these exigencies, it would seem very advisable that all youthful workers be subjected to a thorough physical examination at least once every six months, and to suggest that, in an ideal community, the same might be carried on in connection with continuation schools. Emphasis must be given to the fact that most youths, particularly those who leave off schooling at the first possible opportunity, enter so-called “blind alley” occupations and belong to a “youthful helper” class which has all the hazards of adult workers with no appreciation of physiological differences.

THE WORK QUALITIES.

It is next in order to leave the individual and consult the work qualities in order to designate and estimate the health hazards which may be present. A convenient arrangement for hazards themselves, which we adopted in the Ohio survey, was that of simple terms which could be remembered easily by the physician-

investigator as he was inspecting the different departments and observing the trade processes in an establishment. Various human and physical relationships were inquired into as shown in the blank forms herewith. The hazards to be specially sought for were designated simply as dust, dirt, darkness, dampness, devitalizing air, heat, cold, fatigue, inactivity, infections, poisons, compressed air, odors, and incentives to stimulatism. Each of these simple terms stood for a coterie of subjects or sub-hazards. I believe that the limits of physiologic toleration of each and all of these hazards are rapidly nearing standardization.

THE PLAN IN THE OHIO SURVEY.

In the Ohio survey we were obliged simply to opionate these hazards wherever found as "negligible," "fair," or "bad," as direct observations appeared to show. To compile, collate and summarize the mass of information which poured into the office at Columbus, we were forced to make up our own classification to a very large extent. In fact, no classification was attempted until the results of the survey in the various fields pointed the way. Investigators were instructed to regard the trade-process as the unit and to determine the extent and character of any health hazards to be found (1) in the trade process, (2) in the work space in which it was carried on, and (3) in the industry in general. A trade process is definable as the total application of an individual worker who is performing some industrial duty of fixed char-

acter. It is called an "occupational designation" in the census classification. Usually such trade "processers" are distinguished by some trade term such as "feeder," "sorter," "molder," "solderer," and the like. They may be skilled, semi-skilled or unskilled workers. The only essential difference is that the skilled worker exercises his mental power in that he uses his imaginative faculties, whereas the unskilled worker (at a trade process) is preëminently a habit slave or a sub-conscious, or reflex worker.

The Ohio survey was devoted entirely to gainful occupations, and, under this head, very largely to manufacturing industries. With the completion of two seasons of work, 1,040 establishments had been covered, employing a total of 236,000 wage-earners, exclusive of clerical forces. Establishments were divided into six classes according to the chief health hazard found to exist in the most hazardous process. These six classes, listed in descending order of economic importance, were (1) those having a known association with the use of poisons, (2) with dust, (3) with fatigue, monotony or inactivity, (4) with heat, cold, moisture or dampness, (5) with the risk of contracting communicable diseases, and (6) with miscellaneous hazards, such as abnormal atmospheric pressures. We used as an industrial basis the 1910 U. S. Census of Manufacturers' classification for industries. The available state vital statistics for each such industry were compiled. Next the principal hazardous processes in each industry were stated and defined as discovered by

DEPARTMENT REPORT

OHIO STATE BOARD OF HEALTH

Survey of Occupational Diseases

City.....	Date.....
Establishment.....	Location.....
Department.....	Health of workers considered in construction.....
Intended for.....	Males..... Females..... Youths..... Minors.....
(Chief) process.....	No. Employees.....
Character of work.....	Work shifts for 24 hours.....
(Other processes.....)	Hrs. per shift..... Night..... Overtime.....
Modern methods?.....	Noon time..... Other recesses.....
Unions.....	No. skilled..... Unskilled.....
Attitude toward workers.....	No. by age-groups.....
Type of workers.....	Seasonal influence.....
Retention of workers.....	Placards.....
Health appliances.....	Change rooms..... Lunch rooms.....
Health instructions.....	Washing..... Showers..... Time allowed.....
Lockers.....	
Toilets.....	

Obverse Side of Blank Form Used for Each Process in Ohio Survey. A simple code of symbols aided in indicating varying degrees of hazards.

INDUSTRIAL HEALTH HAZARDS

1. DUST from process: type.....breathed..... skin..... control.....
2. DISORDER: workplace..... neighborhood..... homes..... DIRT: from process.....from negligence.....Floor: type..... cleaning: O. K.: dry, wet, oil, during work hours?.....frequency....
3. DAMPNESS: water..... steam..... humidity..... dryness.....
4. DARKNESS: during day..... reason..... artificial lighting: AEGO by the process..... efficiency.....
Injuries from contrasts, shadows, glare, Ought colored glasses to be worn?.....Are they?.....
5. IMPURE AIR: rebreathing, free flames without vents, salamanders, de-oxidizing processes, fumes, vapors, gases.....
Ventilation: of quarters..... of processes..... methods.....
6. HEAT: process exposure..... degree..... protection: mechanical.....O. K.?.....
Personal (rest intervals, washing facilities, shower bath, etc.).....O. K.?.....
7. COLD due to: process, inefficient heating, drafts, sedentary work, alternation with heat.....
8. FATIGUE: laborious work, long hours, piece-work, speeding up, monotony, constant standing, constant strain, chairs without backs.....
Faulty postures..... jarring processes..... body pressure..... eye strain..... loud noises: rest rooms, work variation and recreation.....
9. INACTIVITY: provisions for exercise..... for recreation.....
10. CAISSON WORK: air locks.....
11. INFECTIONS: crowding (irrespective of room space), common towels, cups, wash places, improper closets, spitting on floors, absence of cuspidors.....
Infectious materials, mouthed articles, wiping rags, oil, frequent trivial injuries, callouses, flying particles...
Selected workers, physical exams., medical supervision, goggles, gloves, first aid and hospital arrangements...
12. POISONS: kind and form..... sample taken..... Am't of risk.....
Workers ignorant, misbranding, lack of instructions, disregard of instructions, wrongful instructions, harmful regulations, moustaches, beards, eating at work or in work rooms, personal care, efficient medical supervision, gloves, respirators, proper: clothes, lockers, washing facilities, eating place, water closets, MECHANICAL PROTECTION.....
13. ALCOHOLISM: drinking water "good," properly cooled, plentiful; liquors permitted during work; subjection to dust, bad air, fumes, gases, vapors, heat, cold, dampness and poisons, saloons near, employer mindful, home gardens, workers' welfare department.....
14. VENEREAL DISEASES: common handling of articles, sexes working together, immoral atmosphere.....
Signed.....

Reverse Side of Blank Forms Used for Each Process in Ohio Survey. A simple code of symbols aided in indicating varying degrees of hazards.

our investigation. In number, these processes ranged from one to as many as thirty for each industry—in some instances, practically all processes were found within a single establishment. It became early apparent that processes could be divided into two great groups, viz., general and special. General processes include those apt to be found in connection with any industry or establishment such as furnacing, stationary firing, machine shopping, woodworking, and the like. Special processes are those peculiar to certain industries such as rubber calendering, pottery kilning, glass blowing, and the like. After compiling the information obtained as to the hazards of the process itself, of the work space or department environment, and for the industry in general, including human relationships such as the question of unions, attitude towards workers, type of workers, retention of workers, etc., the health complaints and occupational diseases which had been obtained by the investigators and, to a less extent, through the occupational disease reporting law, were classed with their respective processes. After all the evidence was in, a morbidity table was constructed for each industry and each hazardous process within the industry, to which was added a final column giving, as nearly as could be judged, the probable morbidity rate for each trade-process. To assist in this estimate, other evidence, particularly that derived from experiences in hospitals, dispensaries, reports of physicians and other treating agencies, was drawn upon.

A CHIEF SHORT-COMING.

While the above plan appears to have worked out quite well for a classification and description of the health hazards of occupations so far as we went, it does not cover enough industries nor is it at all complete in showing the *total* disasters which may occur to health in the presence of the various hazards found. This study of the maladies of workers was found to be just as hopeless a task in Ohio, as far as completeness was concerned, as previous experiences had shown it to be in Illinois, because of the laxity which was found to exist among treating agencies and physicians in the keeping of records or of the making of notes concerning the occupational history of their patients. Such occupational complaints and diseases as are noted in our report are, therefore, of a limited character in both extent and number, although, I believe, trustworthy as far as they go.

TO FIND OCCUPATIONAL MORBIDITY.

How shall we determine the prevalence of occupational morbidity? Managements of large establishments have attempted this in a number of instances in this country, and issued reports showing the results of both physical examinations and health inquiries. As a rule, the findings have been surprisingly small, not only in the percentage of afflictions which were occupational in character, but in total morbidity—so small that one who has studied mortality statistics at all is inclined to doubt these reports. Some research in this direction, however, has convinced me that such results are

consistent because, first, such undertakings have been made only in our more progressive establishments where health hazards are most apt to be minimum, and secondly, because the vast majority of workers-at-work are still in possession of their physiologic states (in different degrees) and where strains exist the examiners do not consider them abnormal. Hence, the contention of employers as a group that there is very little "sickness" among their employees is usually quite true. If, on the other hand, a similar inquiry were to be made, such as would cover all of the past employees of any of these same establishments who are not working at present or who are doing other forms of work, or who do not work steadily (not because they are sick, but because they "do not feel like working today"), a surprisingly large percentage of total afflictions, and many with distinctive occupational ear-marks, would be found. My observations tend to show that there is a varying period of idleness associated perhaps with more or less dissipation, poor food and lodgings, between the period of overstraining exposure and the period of actual sickness. I believe it very necessary to point out at this place that the real place to search for occupational health complaints and for occupational diseases is neither at the work place nor on the sick bed, nor among those who voluntarily seek aid for ill health, but at the homes, lounging places, employment offices, and workers' headquarters. Particularly important, I believe, are all workers who are temporarily out of

employment of their own volition, usually expressed as "dissatisfaction with the work." By all means *home surveys* in workers' living communities will discover occupational health complaints and occupational diseases. When we go one step further, on the other hand, and examine and question those who are actually diseased, we generally find occupational factors forgotten about and occupational diseases masked by secondary afflictions. Occupational diseases, then, are essentially perturbations of health of early character which are found between the work place and the sick bed.

THE CLASSIFICATION SCHEME.

It is very desirable, from the point of view of the sanitarian and health economist, that a classification of occupations be made which is based essentially upon hazards. To do this, it is necessary to take a broad view of the meaning of the word "occupation" and its scope. An occupation should be looked upon as work carried on in some type of work *space* and classifiable under some form of industry. For the work application and the industry, I believe it safe, for obvious reasons, to accept as a basis the recent census classification of "occupational designations" and "industries." Each occupational designation must be amplified, however, for our purpose if we would attempt to indicate hazards.

I believe it is possible to arrange a short-cut scheme which will include the hazards for any occupational designation. In the first place, a great amount of grouping of hazards can be done by "industries" and

"occupation groups" so that each "occupational designation" may be satisfied, with, perhaps, one to four words or symbols which express its distinctive hazards. To this end I would suggest that a competent committee or body be asked to draw up a list of all possible health hazards which may occur in any and all industries and processes, so far as known, or reported, and to group these hazards, and to symbolize them. It may be possible, indeed, to agree on some tentative basis of grading each of them, at least into three classes, as "negligible," "fair," and "bad." A fair beginning might be made by compiling the information already at hand in various reports, standard texts, and supervisory offices. With the aid of the "Classified Index of Occupations" as prepared by the Census Bureau, I am confident that a single column could then be made to show symbols which would indicate the hazards for each "occupational designation."*

THE SCHEME FOR TOTAL HAZARDS.

Attention is called to the accompanying diagram—"Analysis of Occupations in Relation to Health Hazards." I would consider three classes of hazards for all occupied persons: those of the industry, those of the work space, and those of the (trade) process. The hazards of (1) the industry may be classed as of general character, such as the geo-

graphic location (country, town, or city; latitude; altitude; water and soil); climatic conditions (seasons, temperatures, relative humidities, sun and wind); biologic relations (insects, animals and plants, and all features, except those of the work room, which have to do with obnoxious human relationships). A large class of persons work at industries-as-a-whole, *i. e.*, there is no particular work space nor trade process. The work of this class, therefore, is of diversified character, and the hazards encountered, even in various departments or trade processes, tend to be of minor significance since, as a rule, they do not act long enough at any time to exceed physiologic tolerations. *Agriculturists, general laborers, members of supervisory forces, professional persons,* and, to some extent, those in *transportation, public, domestic and personal* service belong to this class. As an insurance hazard, the workers who belong to the whole of an industry will have about the average morbidity and mortality for that community.

The next phase (2) of the classification concerns the immediate work space environment or, for convenience, the "departmental" influences of the industry. The hazards here can be conveniently divided into three groups: chemical, physical, and physiologic. As practically the same hazards exist, also, in connection with many trade processes, a discussion of department

* Attention is directed to a system of classifications of occupations by S. M. Bogoslovski, Moscow, 1913, which is commented upon by *Archiv. Für Soz. Hyg. Und Dem.* July 1914, pages 471-472. The author has considered 5,284 trade processes in alphabetical order. Each trade process is numbered and a brief description of the health hazard accompanying each one is given, according to examples shown. The broad divisions are four: (1) workers in closed-up rooms; (2) workers under the free sky; (3) workers partly under both influences; (4) workers in subterranean channels and beneath the ground.

ANALYSIS OF OCCUPATIONS IN RELATION TO HEALTH HAZARDS.

((*) signifies slight hazard; * signifies fair hazard; ** signifies considerable hazard.)

CLASSIFICATION BASIS: "Index to Occupations," U. S. Census, Feb., 1915.		"Industry" (as named)		"Occupations" (as named).	
THE PHYSIOLOGIC TYPE OF WORKER. Youth ** Female * Male		General Worker.		Helper Class. ** Processor Class.	
THE PHYSIOLOGIC TYPE OF WORK.		Diversified.		Diversified, but limited to a space. ** * Constant application. (Skilled, semi-skilled*)	
THE "OCCUPATION."		INDUSTRY.		DEPARTMENT (work space).	PROCESS.
THE HEALTH HAZARDS Basis: Results of inspections and investigations.	**	(1) <i>Geographic</i> — Rural, village, or city* Latitude Altitude Water Soil (2) <i>Climatic</i> — Seasonal influences Temperatures Humidities Sun Wind (*) (3) <i>Biologic</i> — Plant relations Animal relations Human relations *	** * ** * * (*) (*) * * (*)	(1) <i>Chemical</i> Poisons Infections Odors (2) <i>Physical</i> — Air movement Temperatures Humidities Illuminations Air contaminants Air pressures Sanitary inadequacies (3) <i>Physiological</i> — Irritants Stimulant incentives Dissipation incentives (*)	(*) * (1) <i>Chemical</i> — Poisons Infections Odors (2) <i>Physical</i> — (Air movement) Temperatures Humidities Illuminations Air contaminants (Air pressures) (Sanitary inadequacies) (3) <i>Physiological</i> — Fatigue (over-use) Inactivity Irritants Stimulant incentives Dissipation incentives (*)

* Filled out for hazards for a 16-year-old girl employed as a "cigar roller" in a Cincinnati factory. Note how many hazards belong to the *work space* rather than to the *trade process*—a class of hazards often overlooked.

hazards will be stated later. All "department" workers are doing more or less diversified forms of work, but within a more or less restricted space. If their work itself is restricted, they are then performing definable trade processes and are not in the proper sense "department" workers. They

are subject to the general hazards of the industry as defined above, and, many times, to some of those of the trade processes which are carried on within the given department. These workers consist preëminently of the "helper" class, and of mixed workers, and include a large percentage of the

"laborers" mentioned in the census classification—that great class of workers miscellaneously employed in each industry which hitherto has remained quite unclassified. It is to be noted especially that the work of this class is just diversified enough to preclude the effects of work which requires the use only of certain parts of the organism, and characterized by over-use or inactivity of some parts. The health complaints and occupational diseases of this class are primarily those of work space environment rather than those of trade application. These workers belong especially to the uneducated classes, change work places frequently, and have few ideals in regard to hygiene and sanitation. As sickness risks, they are a bad class without exception. Their industrial hazards may be extreme, but they are slow to comment upon them. It is only by investigations and work-place inspections that we can comprehend them. Furthermore, we must wait until our ventilation and illumination commissions and experts, who are now working in conjunction with physicians and pathologists, have laid down for us the standards for healthy work space environments. As soon as these standards have been agreed upon, I believe it will be possible to group all work spaces into about five or six grades according to the hazards found to be present.

The last (3) class of workers compose the trade process followers, or, for convenience, the "processors." Here are included the vast percentage of our so-called "occupations," both as generally understood and as denom-

inated in the "Classified Index to Occupations." Processers are engaged in the same, or in repetitions of the same, applications. Physiologically they are distinct because they show the local effects of fatigue first (in some organ or part, and a certain percentage may develop neuroses limited to these parts). They may be skilled workers such as the various types of painters, molders, riveters, etc., or, they may be semi-skilled, such as press-hands, labelers, sorters, etc. Whether skilled or semi-skilled, their respective processes themselves have peculiar chemical, physical, and (or) physiologic hazards. These hazards are in addition to those of the department or work space, and to those of the industry in general. To specify: *chemical hazards* comprise those of poisons in any or all forms, including deoxygenators of the breathing atmosphere, infectious agents, and objectionable odors; *physical hazards* comprise those of air-circulation or stagnation, artificial temperatures, work space humidity variations, air contaminators (smoke, dust, and particulate matter), faulty illumination, faulty air-pressure, and sanitary inadequacies having to do with the thirst-assuaging facilities, toilets, eating arrangements and cleansing arrangements, both personal and environmental; while the *physiologic hazards* comprise fatigue, monotony, inactivity, the action of mechanical irritants, and all factors in the immediate surroundings which may incite dissipation or stimulantism (the desire for stimulants in order to whip up physiologic functions). The health

risks of all "processors" are graded according to the findings of inspections and investigations. For a fair percentage of them, I believe specific hazards are already fairly well known as well as specific occupational diseases. Further information must come from many more inspections and investigations. All persons in possession of specific information regarding industrial health hazards or occupational complaints of any and every character should be encouraged to publish the same in brief form. For instance, the "Industrial Hygiene"

pages of the *Journal of the American Public Health Association* might be extended so as to be utilized for this purpose. Or, were a committee or body appointed, as suggested above, publicity could be made to result in the sending of such information from all parts of America to this committee. By similar plans the accident prevention workers of the country have already accomplished wonders in locating, standardizing, and classifying accident hazards. The time is now opportune for attempting the same for health hazards.



FOURTH ANNUAL REPORT OF THE INTERNATIONAL ASSOCIATION OF DAIRY AND MILK INSPECTORS.

The first three annual reports of the International Association of Dairy and Milk Inspectors were of a character to lead those who are interested in bettering the milk supplies of cities to look to them for thorough discussion of the problems that arise in the effort to control the production and sale of milk. The work of the association is constructive and, therefore, much more helpful than the criticism that merely uncovers faults without either distinguishing their relative importance or proposing sound procedure to rectify them.

The fourth report continues the policy of the association and will be welcomed as cordially as those that preceded it. Some of the papers of general interest may be noticed. The report of the Committee on Dairy Farm Inspection by C. B. Lane takes up difficulties in the use of the Score Card and the Committee on City Milk Plant Inspection, by E. C. Krehl, outlines the important points to be observed in such inspection. Ernest Kelly's paper on the "Need of Medical Inspection of Employees Engaged in the Production of Milk" brings the conviction that other cities will have to follow the lead of Montclair, N. J., and take up this work. J. F. Anderson's presentation of the reasons that milk standards are necessary is very helpful.

C. L. Alsberg's statement of the policy of the Bureau of Chemistry regarding dairy and milk under the Pure Food Law will be read attentively by many who will be glad of an authoritative declaration on this matter. Papers on bovine tuberculosis, foot and mouth disease and contagious abortion by Mohler, by Melvin and by Shroeder, bring out points that must be carefully considered in upbuilding the production end of city milk supply and in protecting the health of milk consumers.

Mayotte's paper on the milk supply of Montreal is interesting and so is that of Seaman on the milk supply of Manchester, N. H. The difficulties of small communities in getting adequate inspection are set forth by Purrington of New Hampshire and Colton of Cumberland, Md. Krehl's paper on "Detroit's Experience in Enforcing Compulsory Pasteurization of Its Milk Supply" is timely because many cities have this problem to face. The other papers in the volume are worthy of careful attention and to some no doubt will appeal more forcefully than those that have been mentioned.

The volume, like its predecessors, reflects great credit on its editor, Ivan C. Weld of Washington, D. C.

H. N. P.

THE RELATIONSHIP OF IMPAIRED PHYSICAL CONDITION TO ACCIDENTS.

C. G. FARNUM, M. D.,
Chief Surgeon, Avery Company, Peoria, Ill.

Read before the Industrial Hygiene Section of the American Public Health Association, Rochester, N. Y.,
September 9, 1915.

Doctor Farnum points out the value of coöperation between medical and safety departments with an object of fitting the man to the job for which he is physically fit, a means of reducing accidents. This paper tells what one company has done.

THAT impaired physical condition constitutes an extra hazard to the working man is a fact so self-apparent that statistical data is not necessary for the proof of such a contention. It stands as indisputable that a man with bad vision, defective hearing, with chronic alcohol poisoning, tuberculosis, a heart lesion, or degenerative changes in the blood vessels and kidneys, cannot do his work in the keen, accurate, wide-awake manner of a normal man, and he thereby becomes a greater industrial risk than his normal or less unfortunate neighbor. Likewise, men with atrophic muscle groups, ankylosed joints, amputated members, or impaired reflexes, work under a constant handicap of greater or less degree, and that these handicaps are a source of increased hazard is obvious.

Wherever routine physical examinations of large groups of men have been carried out, it has been most strikingly demonstrated that here in America the number of physically perfect men is extremely small—so small that but a meager part of the

work of the world could be carried on by them. The statistics on this point vary from less than 1 per cent. to 12 per cent., depending on classification and the thoroughness of the examinations. On the other hand these same routine examinations reveal the equally interesting fact that the percentage of men whose defects render them unfit for any form of employment is likewise exceedingly small. Between these two small groups that occupy the extremes in the scale, lies the incalculably huge army of workers who are doing their daily tasks under greater or less handicaps to their efficiency and progress, and whose accident hazard is increased to a corresponding degree.

What, then, is the solution of this huge problem that involves the safety and efficiency of millions of men and women? Will the installation of safety devices, the education of the men to think and act safely, and the coöperation of men and management solve it? It will help, and it represents a gigantic stride in the right direction. It will reduce, but it will not remove the extra hazard.

At the Avery Company, at Peoria, Illinois, where for three and one-half years we have conducted most exhaustive and painstaking physical examinations, not only of every man who was in the employ of the company at the time this system was instituted, but also of every applicant before he is permitted to go to work, we believe we have developed a system that offers some hope for a solution of the problem of the extra hazard of the defective workman.

At the Avery Company we pay very little attention to physically perfect men. It is an interesting thing to find a young man who shows no suggestions of physical defects. It is still more interesting to find an old one. But other statistics from our records show that the physically perfect man is not the most reliable man, and reliability is a large factor in safety and in plant efficiency. A search for physically perfect specimens is not our object. What we are trying to do with our physical examination is to ascertain whether the individual man's physical condition is compatible with the work that he is going to do. Time and again have we been asked by other employers for a list of the defects which in our judgment render a man unfit for employment. We have no such list. Each individual man constitutes an individual problem and if there is any question as to his physical fitness for the work for which he is being considered, or if it appears that he might be unsafe at that work, then a consultation with the safety inspector, who is also head of the employment department, ensues, and the man is trans-

ferred to work for which he is better fitted.

The two considerations in the employment of men at the Avery Company are efficiency and safety, and physical perfection is not necessary for the fulfillment of either of these requirements. We have come to look upon this matter of the fitting of the man to the job as so important that at this plant no foreman is permitted to hire or to discharge a man or to transfer him to any work other than that to which he was assigned. He can only return him to the employment department where another effort is made to fit him to work he can do better. Mr. Kinsey, our superintendent, believes that any man who is satisfactory to the employment department, and acceptable to the medical department, is capable of doing some work safely and well. The task is to find the job that the man fits.

In an effort to determine just how successful we had been in our effort to fit men into work that would be safe for them, we have taken certain groups of men of impaired physical condition and have computed the ratio of accidents in these groups to accidents as a whole. In the selection of these groups we have taken only the more glaring physical defects and have not included the minor ones.

These groups are as follows:

1. Diseased hearts and circulatory apparatus.
2. Diseased kidneys and diabetes.
3. Defective vision.
4. Defective hearing.
5. Venereal diseases.

6. Hernia.
7. Diseases of the lungs.
8. Atrophies, ankylosis, amputations, impaired reflexes.

We have omitted many things that might have been included and which are covered by our examinations, such as flat foot, varicose veins, constipation, over-weight, under-weight, decayed teeth, diseased gums, infected tonsils, diseased external eyes, diseases of the nose and accessory sinuses, skin lesions, and hemorrhoids, all of which defects might be factors in the production of accidents.

The results of these tabulations are very interesting. For example, among the men whose vision is five-tenths or less in one or both eyes, and those who wear glasses at their work, there is a decreased accident hazard among our men of $2\frac{1}{2}$ per cent. as compared with the whole. In the group made up of those with actual heart lesions, valvular or myocardial, marked arterial degeneration, or a systolic blood pressure of 190 or more, the incidence of accident occurrence is 2 per cent. less than that of the whole. Among those whose hearing distance was reduced to one-fifth of normal or less, the frequency of accidents was the same as for the entire plant. On the other hand the number of accidents among the group made up of actual kidney disease and diabetes was $3\frac{1}{2}$ per cent. greater than among the whole, and venereal diseases within the last five years showed an increase of $2\frac{1}{2}$ per cent. The remaining groups, hernia, lung diseases, amputations, ankylosis, etc., were so small that they were not

considered separately but are included in the total.

It is undeniably true that no one of these findings can be accepted as conclusive, since there is no one of them that could not be explained on the basis of the margin of error that has to be considered in any group of figures of this sort. The total, however, is striking, and from it we believe we may draw conclusions. It shows that at the Avery Company the added hazard of the men who possess these more severe physical defects is, under our system of medical and safety supervision, but eight-tenths of 1 per cent.

This, then, represents the result of our effort at the solution of the problem of the extra hazard of physically defective workmen. We do not know the exact amount of our reduction of accident incidence for these groups, for we have no data on which to base our estimate of the added hazard of these men under ordinary conditions, but that it is greater than eight-tenths of 1 per cent. is, we believe, indisputable, and with but this trifling difference, we feel that we have been in some measure successful in our effort to make our physically defective men safe men.

I would not have you think that these combined efforts of the medical and safety departments to fit the man to the work so he will be both safe and efficient, represent our sole idea or our sole practice in the care of our workmen. The fitting of men to their jobs is but an incident in the physical examination of men, and the physical examination is but one part of the medi-

cal supervision of the men as it is practised at the Avery Company. The subject, then, of this paper deals directly with but one small area in the field of our endeavors. But it is not possible to isolate such an area and deal justly with it. We must give some consideration to its environment. Just as a safety department, to render real service, must do more than merely install safety devices, so a medical department must do more than merely examine men. In either case this would be the minimum of service of that department. The real work of these two departments must be more comprehensive, more positive, and more constructive, and, most important of all, they must work hand in hand and operate as a unit. How foolish it would be to install safety devices and then fail to educate the men on safety lines and develop their coöperation! Likewise, how far short of its possibilities it would be if the medical department merely examined men and recorded their impaired physical condition! At the Avery Company we look upon the physical examination as but the first step in our work of medical supervision of workmen. When it is finished, and his work is decided upon, we discuss the findings in detail with each man, advising and supervising him or coöperating with his family physician and have the man report to us at the dispensary as often as we consider it necessary. He is not left to work out his own salvation, but is continually under our guidance.

Another means of keeping constantly in touch with our men is the requirement that every one who has been absent from work for any length of time, however short or for whatever cause, must report to the physicians at the dispensary before he can return to work. This keeps us constantly in touch with the physical condition of the men and, equally important, it keeps us in touch with the habits of the men.

We care for our men when they are injured; advise them when they are sick; confer with them as to their health and habits; examine them periodically; and supervise them constantly; and whatever be the subject in hand, it is always made a matter of private personal conference. We deal but little with our men *en masse*. It is true we issue bulletins on safety, health, and general information, but at the Avery Company we look upon the individual man as the one essential, basic element in the whole scheme of civilization. We believe in men. We consider them the most valuable things in all the world, and we think that they deserve to be dealt with individually for the solution of their individual problems and needs. No employer's time is so valuable that some of it cannot be profitably spent this way, for medical and safety supervision is not a charitable institution. It is an investment, the dividends on which are efficiency and loyalty—two of the most valuable assets any employer can possess.

HEALTH HAZARDS OF THE METAL MINING INDUSTRY.

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Read before the Industrial Hygiene Section, American Public Health Association, Rochester, N. Y.,
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THE following observations on the health hazards of the mining industry are based on investigations and data collected in various metal mining camps, mostly in the western part of this country, during my detail in connection with coöperative studies carried on by the U. S. Public Health Service and the Federal Bureau of Mines. Health hazards of coal miners are not included. It may be said that these latter are not, generally speaking, exposed to the deleterious agencies that affect metal miners underground, namely poor ventilation and injurious dusts; as far as surface conditions are concerned, both classes of miners are on a par, except that probably more advances have been made in the sanitation and hygienic management of coal camps than of metal camps.

The health hazards of metal miners may be divided into underground and surface hazards. Both embrace general conditions and conditions peculiar to certain districts and local in their nature. Before considering them, I would like to emphasize that investigations of the occupational diseases of miners and of the sanitary conditions of mining camps mark a rather recent field of activity for the federal government, and there is neither extended experience nor voluminous data to bring to bear on the subject, as

there are, for instance, pertaining to the cause and prevention of mine accidents. In a recent interview the Acting Director of the Bureau of Mines stated that "the loss of life from accidents in the different branches of the mining industry is a discredit to the nation. It calls for more extended inquiry on the part of the government with proper dissemination of the results obtained. It calls for more stringent supervision by the states and for more determined coöperative effort on the part of both the miners and the mine owners in the way of making and enforcing safety regulations." If this is true for loss of life from accidents, it is even more emphatically true for loss of life from disease, and not only for loss of life, but for illness with its consequent poverty and suffering. A variety of circumstances combine to make this condition of affairs possible. Mining in many places is still in its infancy; mining camps may be isolated, sometimes temporary, and consequently not under an efficient municipal control; state mine inspectors are apt to be hindered in the execution of their duties by the limitations that encompass political jobs. We have among our miners an ever increasing majority of foreigners who do not understand our language and who often have little or no appreciation of sanitation,

though ignorance in this respect is by no means limited to the foreign miners. Finally, we have too often, on the part of both mine operators and miners, ignorance and indifference to unfavorable working conditions. Too often is it the custom to induce men to work under adverse conditions by offering them a bonus rather than correct the condition at fault. This is certainly a policy unfavorable to the public health, and its economical value to the operator is becoming a matter of dispute.

Of the general hazards to health that the metal miner is called on to face, the first is poor or inadequate ventilation. In considering ventilation in metal mines we must understand that it does not rest on the secure foundation that does ventilation in coal mines. Two reasons are apparent for this. The explosive gases that come off of coal beds necessitate thorough and adequate ventilation before the coal can be mined. These gases are, with a few exceptions, not found in metal mines. Also the geometrical plan in which coal is mined facilitates ventilation (being in fact designed for that purpose), while the irregular and complex workings often seen in large metal mines confuse ventilating currents, short circuit them and tend to change their direction. It is but natural, therefore, that ventilation in metal mines is often a perplexing problem and too often but a partially solved one. The result is that where artificial ventilation has become necessary, and is still experimental or not yet entirely efficient, we find men working under conditions

of heat and humidity that impair alike both their vitality and their output. There is still much discussion as to what constitutes adequate ventilation, but it may be stated, both as the result of practical experience and experiment, that a temperature of 80 degrees, moist bulb, represents about the maximum at which men can do hard work on the basis of an eight-hour shift without danger to themselves or an impaired efficiency. This is borne out by extended observations underground by Mr. Higgins of the Bureau of Mines, and is in harmony with the recent findings of the New York State Commission on Ventilation. We have no laws to regulate the matter, either state or federal. In France the law limits the regular working temperature to 95 dry and 86 degrees wet bulb, except in necessity. In Germany when the wet bulb is above 80 the shift is reduced from eight to six hours. In Victoria and New Zealand, 80 degrees wet bulb is the limit, with allowable exceptions. Some large mining corporations have recognized the economic value of keeping down the temperature in their mines and have developed artificial ventilation to the point where they can do so, but there is far too much work being done under conditions of heat and humidity that favor physical breakdown and consequent disease.

As a corollary to poor ventilation, we have the dangers of poisonous gases and powder smoke. These come rather under the domain of the first aid man, except that little is known or appreciated of the harmful

effects of breathing small amounts of powder gas over a long period of time. It is possible that the cumulative effects of powder gas produce more harm than is commonly imagined.

Another important health hazard is that of rock dust. Pneumoconiosis due to rock dust is in some respects a local hazard, depending on the varying nature of the rock in different mining localities, but may be briefly considered here as a whole. Miners' asthma, miners' consumption or miners' roup, as it is variously called, is an important disease and a strictly occupational disease of the mining industry, and one that has, so far, escaped any extended observation in this country. It is probably widespread and has been much confused with pulmonary tuberculosis for, while these two diseases are entirely distinct, they may exist together. Rock dust is a dangerous industrial dust, especially when it has a high silica content. It produces a condition that is not merely harmful in itself, but favors the occurrence of tuberculosis by its direct damaging effect on the lung tissue, and we must therefore credit siliceous rock dust with being one of the factors in the prevalence of tuberculosis among metal miners. An investigation of this subject among the zinc miners of the Joplin district has been carried on during the past year by Mr. Higgins, mining engineer of the Bureau of Mines, and myself. As set forth in a preliminary report (Technical Paper 105, U. S. Bureau of Mines) it was determined that there was an unusual amount of pulmonary disease among these miners

as compared, for instance, with similar miners in southeastern Missouri. The only important difference between the two places is that in the Joplin district mines much flint dust is found. This flint dust is very hard, very insoluble (having a silica content over 95 per cent.), and forms with sharp cutting edges. Exposure to this dust for a few years brings on disablement from dyspnea and cough and finally death from tuberculosis. That is, the flint dust having mechanically injured the lungs of the miners exposed to it, a suitable soil is thereby formed for the tubercle bacillus. The exact relationship between silicosis and tuberculosis is still a matter of investigation, but there is no room to doubt the intimate connection between flint dust and a high death-rate from tuberculosis when both exist in the same locality and affect the same group of workers. So far the Joplin district is the only one where these investigations have been pursued, but it is expected to continue them in other mining districts under the coöperation of the Public Health Service and the Bureau of Mines.

Housing conditions among metal miners necessarily differ widely. Broadly speaking, the principal point at issue is apt to be whether or not the miners in any given locality live in company houses or on company controlled ground. Model housing conditions are usually found where the employing companies control the homes and the ground and provide for their upkeep and sanitation. More often this is not the case and in a great many mining communities

would be impossible. Though the surroundings may be wretched and forlorn, still there is generally plenty of fresh air, plenty of sunlight and plenty of room, and each mining family is apt to live in its own home, though this may be but a two- or three-room shack. Aside from a few places with a large foreign population and where there are big boarding houses that are badly overcrowded, there is nothing comparable for instance to the tenement house districts of our large cities. Where the English-speaking miner is established, the housing is apt to be good; where the foreigner is in the majority and not supervised, the housing is apt to be bad. Insanitary privies, bad milk and other menaces to health do their damage to the mining community, as elsewhere, but there is no evidence to show that the miner gets more than his share. There is a growing tendency among mining corporations that employ many men to provide for their welfare aside from working hours, with a beneficial result to their housing.

Local health hazards are, so to speak, mostly climatic. They include hookworm disease, amebic dysentery, and the disorders due to exposure.

Hookworm disease has been found among miners in southern California. Aside from that it does not seem to have gotten a foothold in other mining districts, though it is a menace in Arizona mines, especially when Mexican labor has been introduced. There is so much acid and alkali water (so-called) in metal mines that it is doubtful whether underground conditions alone could contribute much to the spread of hookworm.

Amebic dysentery has been noted by the physicians in some Arizona mining camps, following the importation of Mexican labor. With the poor sanitary conditions that prevail among these people, amebic dysentery may assume a rôle of importance as a health hazard.

Exposure is a serious matter in those mining camps where the winter weather is severe and the mines themselves are warm. Men working in warm places, tired and heated at the end of their day's work, at quitting time are suddenly exposed to a drop of temperature of 60 or 80 degrees or even more. Such exposure may have serious results, it undoubtedly adds to the incidence of pneumonia, and much of it is capable of being avoided.

It is possible that, as industrial diseases receive more and more attention, there may be found other health hazards of the mining industry that are not now appreciated or recognized. There are sufficient already, however, to demand thorough attention and thorough remedial measures. We have seen in the last few years a sturdy, vigorous and still growing movement for the conservation of life underground, the safety first movement. It is but natural that this movement should have manifested itself along the more obvious lines. But when we have educated both the mine worker and his employers to the point where they will realize that there is just as much connection between rock dust and death or poor ventilation and death as there is in the case of an unguarded ladder way or an unsafe roof, then we will conserve many lives where we have saved one before. Last spring,

during the investigation of the prevalence of tuberculosis among the zinc miners in southwestern Missouri, an educational campaign was undertaken to bring home to the miners the danger of flint dust. There were lectures illustrated by moving pictures and lantern slides showing magnified particles of rock dust. Visits were made to the mines and short talks given at the change houses during the noon hour. Talks were also made to the operators at noon-day luncheons. The result is that the operators are installing water devices to lay the dust and the miners have

lost their previous indifference and use the water when it is given them. While laws governing these and other health features are necessary, yet it is upon such education that we must rely, for the mere passing of laws will not accomplish the desired result unless those affected are convinced of their necessity and all concerned coöperate to enforce them. With this and with a stricter supervision of health hazards by state bureaus of health and of mines, we should see a reduction in death and disability from disease commensurate with what we have seen in the case of accidents.



COMMON COLDS.

Some three years ago Kruse pointed out that while common colds are undoubtedly infectious the rarity of bacteria in the secretion and their short existence there is against the presumption that they are concerned in the infection. He succeeded in producing colds experimentally with the filtrate obtained from the nasal secretion of an assistant suffering from coryza which was diluted fifteen times with normal salt solution. The incubation period varied from one to four days. G. B. Foster, Jr., Boston (*Journal of the American Medical Association*, April 15, 1916), has repeated Kruse's observations and added to them the culturing in vitro of the living virus. A definite conclusion as to the nature of the virus would be premature, but the experimental methods used are so different from those previously employed and the results so suggestive that he hopes a preliminary report will stimulate further investigations by others. The nasal secretions of three individuals were employed. The filtrates were prepared as follows: The nasal secretion was blown into a Petri dish, mixed with 10 cc. of sterile 0.8 per cent. salt solution and carried to the laboratory in a sterile test tube. It was then poured into a sterile shaking bottle containing smooth round glass beads and agitated for ten minutes in a shaking machine till a perfect homogeneous opalescent mixture resulted. This was passed through a small Berkefeld N filter which had not been used before and which proved impermeable to ordinary bacteria. Filtration was accelerated by suction and in fifteen minutes a perfectly clear filtrate was made. Human blood agar plates were prepared from the filtrates and incubated at 37 C. (98.6 F.), under both aerobic and anaerobic conditions, remained sterile at the end of seven

days. Ten soldiers at Fort Banks, Mass., in good health at the time, who volunteered for the experiment were inoculated by dropping from three to six drops of the filtrate into each nostril with the result of producing the usual symptoms of acute coryza in from eight to thirty hours. Other symptoms occurred in several cases, such as sore throat, cough, and pain in the back, etc. Attempts were made to cultivate an organism from the filtrate, the possibility of which was suggestive, but were unsuccessful in revealing anything definite. The appearances of the culture, changes of color etc., are described. Under the dark-field microscope there were seen myriads of extremely active minute bodies occurring singly or in pairs and in agglomerations. They were so minute and movable that a definite idea of their morphology could not be formed, and the conclusion that they were microorganisms would not be tenable without further evidence. Since the attempts to demonstrate microorganisms in the cultures which showed macroscopic changes suggesting organisms having failed, inoculation experiments were resorted to and subcultures which had been incubated seven days were used. They also produced acute colds. The experimental evidence altogether leads to the logical conclusion that common colds, a certain type at least, are infectious, and that the causative virus occurs in the nasal secretion, that it is capable of passing through a Berkefeld N filter. They also indicate that transmissions of cold from patients to others may occur through droplet infection or other means of direct or indirect contact. The observation seems to the author significant, and it is hoped that other experiments may elucidate certain matters not yet clear. The details of the cases are reserved for a later publication.

SOME ASPECTS OF HOME USE OF PROPRIETARIES WITH CHILDREN.*

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Washington, D. C.

SOME people say that we are not yet out of the Middle Ages. In some ways it is true that our good old world—not the less good to us because it *is* in the Middle Ages—does hark back to medieval thoughts and slow growing ideas which persistently cling about mossy castles and disused palaces and curiosities that linger from the Life that Was.

Yes, we are linked to the past by good ties and by bad ties. Our heritage is one of survivals—in literature, and art, and medicine, and law, and commerce, as in superstition, and narrowness, and ideas which are unnecessarily complicated and clumsy. So our birth forces us not only into good things, but demands that we clean up *débris* left over from old times, which only serves to hamper us, to impede our path, and to prevent enjoyment of the gold spoons and silver bracerlets on which we cut our teeth. We never can get the right amount of pleasure out of these delightful objects as long as we have to watch out for holes and hummocks just ahead.

The good old alchemists probably never imagined that they were going to give the twentieth century a “run for its money.” Old Nostradamus may have grinned as he wrote down his blackletter fake prescriptions and

love potions specially effective in the dark of the moon or the end of the week or, equally, of no account on Friday or when the hard-hearted lady had a rabbit’s foot. The philosopher’s-stone people and the elixir-of-life grandees quite possibly drooped an eyelid now and then. Perhaps they droop it now if they chance to be reading what is here set down; for we are mixing with the same impulses which erected monuments to them—monuments of memory, which last much longer than granite or marble.

Today, however, the magic makers are putting it up to us. They have unwittingly left quite a heap of dust and ashes, which we are finding very troublesome and which we are almost ready to burn up and destroy for good and all. We want to have a good time with those wonderful gold spoons and christening cups and rubber shoes.

Since we are speaking of things we cut our teeth on, about as good a subject to continue with is the matter of dentition. Children will cut teeth, and when a tooth is cut the children “cry for it.” Let us learn some simple things about dentition. Teeth may make the children cry, but the point for us to consider is, Why still the cry by doping the child?

“Soothing” or “teething” syrups, or cordials, or whatever name may be

* Address delivered at Academy of Medicine, New York, February 16, 1915.

applied to these pernicious products, usually contain narcotics. I remind my readers, we take nothing for granted. We are going to be utterly plain and simple. We shall try to talk in language that can be understood. Therefore we shall not make any further apologies. Nothing can have less reason for our purposes than apologies. Now, just what are narcotics?

Narcotics are things that make us stupider than we are naturally. They make us sleepy. They dull our sensibilities, lessen our perception, often slow the heart, are capable of putting us to sleep. They may even prevent our waking after we are put to sleep; and they induce a craving which makes us require them more and more, while all the time our nervous system loses its grip, becomes demoralized and degraded, and we sink into an abyss of incapacity.

Alcohol, opium, cocaine, chloroform, chloral hydrate, cannabis indica (the hasheesh that induces dreams and illusions in its victims), these are the simpler and more common substances which are so effective in "quieting the child." From these substances others are manufactured or derived. Morphine, heroine, and codeine are words with which every mother should be familiar. They represent preparations or derivatives of opium or its alkaloids and have the same narcotic and habit forming properties.

Narcotics serve to mask disease and to make it harder for the doctor to find out the real trouble. Do not forget this fact when using the "soothing syrup." And, by the same token,

bear it in mind when you uncork the paregoric bottle, or buy the laudanum, or the Dover's powder, or prepare to still the baby's cry in any other narcotizing way. Above all, never lose sight of the safeguard that Uncle Sam has provided.

Uncle Sam requires, as do also most of his states, that the label shall show whether there is one or more of these commoner narcotics under it, and how much. If you think you must—positively must—dope the baby, *read the label*. You are negligent indeed if you fail to read the label. And, if you do not understand what you find on the label, ask somebody. Go to your board of health and ask. Go to your pastor and ask. Or, perhaps best of all, go to a newspaper man and ask.

Narcotics, then, are to be suspected in "soothing" or "teething" preparations. We have to consider them also in connection with diseases of the air passages. They are frequently employed in so-called "croup remedies." Croup is not always the simple thing it is supposed to be. It may be the catarrhal or "spasmodic" affection, which threatens terribly, but is scarcely ever deadly. But, again, what the mother supposes to be croup of the common or garden variety, not seldom proves to be something far more serious and which becomes but more and more dangerous with every hour of delay. This dangerous affection is really diphtheria—diphtheria of the larynx. Mothers should never tamper with diphtheria of the larynx; and, since there is scarcely a mother in the world who can judge accurately as to the real meaning of croup symptoms,

scarcely a mother in the world is justified in depending on her own treatment of croup, much less on the hints or even promises appearing on the label of a proprietary.

Many useless or dangerous preparations are offered for the treatment of coughs. Usually no particular kind of cough is specified by the maker or dealer, so that pneumonia, tuberculosis, and other diseases are included among conditions supposedly such as to be benefited by the "cough syrup" or compound. Preparations which stop the cough should be carefully scrutinized, since this effect is very often due to opium, morphine, heroine, chloroform, or chloral. Whooping-cough is another disease for which narcotic preparations are freely advertised, and one in which the use of narcotics is likely to prove deceptive and dangerous.

Since the advertising phrases very commonly refer to "coughs," "lung and throat diseases," or apply in similar general and sweeping fashion to a number of different conditions, it is well to bear in mind the fact that some of these diseases tend to affect certain structures of the body in such a way as to leave more or less crippling or actual disease in their train. Thus, the heart is likely to be affected in pneumonia, diphtheria, rheumatism, and other diseases. Whooping-cough and measles are notorious in their weakening of the lungs, tuberculosis infection occurring more readily after these troubles. Pleurisy is often accompanied by cough; and, in pleurisy, there is danger to the heart through pressure of the serum which is poured

out in the chest. Further, this serum may be converted into pus, a condition which adds greatly to the patient's difficulty and to the danger which he is caused to encounter. To treat either serous or purulent pleurisy by a ready made cough mixture is to court grave risk of an unfortunate outcome.

Before leaving the subject of coughs and diseases of the air passages, let us read together an exact quotation of a remark appearing in the circular of a cough mixture containing alcohol, chloroform, and heroine; remember, the following expression is quoted as it actually appears: "The taste is very pleasant and children easily learn to like it."

Most true is this statement. No doubt the taste is pleasant. No doubt the victimized children "easily learn to like it!" And, alas, there is no doubt that a drug habit may be easily induced by this preparation offered in such a fashion and thus blandly recommended for such conditions as pleurisy, asthma, consumption, and all respiratory troubles. Please remember these claims are no fancy of mine, nor are they the result of an argument twisted to serve a purpose. They are the claims made actually by the manufacturer.

When one considers the publicity which has been given to the subject of communicable diseases by public health authorities, the wonder is that such serious troubles can be regarded as good material by the proprietary dealers. Nowadays we learn almost at birth that tuberculosis, diphtheria, scarlet fever, typhoid, measles, small-

pox, and other disorders which we get from those already afflicted or on account of previous infection with them, are things for quarantining, special isolation, and the observance of most particular care.

In spite of our fancied education, people still exist who know better than we do that we are *not* as well educated as we ought to be, that there are still a goodly number of dwellers here in our very best of the modern nations—as we are fond of calling ourselves—who will buy so-called cure and prevention of these dangerous illnesses. Diphtheria too frequently affects the heart, the kidneys, the ear, and the nervous system. Scarlet fever does the same, leaving a similar array of weak eyes, paralyses, discharging ears, crippled kidneys, and uncertain hearts behind it. Measles attacks the ears, eyes, and lungs. Typhoid depletes the blood. Erysipelas, which is very lightly regarded by the skin-cure makers, should be understood to be, as it actually is, a severe and dangerous infection which should be quarantined like all other infections. And, to repeat ourselves, which we do most gladly for the sake of a repetition which is intended to be useful, whooping-cough ought to be invariably regarded as a menace to the child and something to be feared as long as the obstinate cough persists. Nor should cessation of the cough allow us to rest secure in the feeling that the lungs are entirely sound and well.

The summarized conclusion is that we should beware of the nostrum which calls itself a microbe killer. Again is it necessary to scrutinize the label,

and if the legend borne thereon promises cure of these grave infections, hunt up the health board and dog their steps until they, busy and overworked as you are likely to find them, yield to your request, visit your residence, and examine the sick child who is potential prey for an easy going label story. Here, for instance, is the sort of thing which should brand a product as absolutely vicious; the exact wording of the label is given:

“In fatal diseases, such as smallpox, yellow fever, Asiatic cholera, typhoid fever, and fever and ague, it is a life preserver that will cure and protect you against attacks of these fatal diseases; for it is the only remedial agent in existence that will certainly cure and absolutely prevent these diseases.” When one pauses to consider the human misery caused by the toll of death exacted by epidemic disease of the varieties mentioned in this false statement, there is no getting away from the thought that many a sorrow leaps to life at the uncorking of a proprietary mixture like this. The children—they cannot help themselves. But the next generation of parents ought to be wiser; and frank discussion, however equipped with bite and sting, is a good friend to the children.

Speaking of children's special ills, perhaps no troubles are commoner than the various forms of diarrheal diseases which come to annoy or threaten the child and its mother. We are learning that these diseases are great death producers among young children and infants. The experienced physician regards with dread

the occurrence of a summer diarrhea in a weakly child or infant. Such diseases make the infant mortality expert point again to figures which he knows should need no further exploitation. From colic to cholera infantum, however, the public is promised immunity and deliverance. Prevent by hygiene, diet, and management, so far as possible. If disease still comes, do not delay and flirt with sorrow by depending on the diarrhea cureall. From slight diarrhea to severe dysentery the progress may be astonishingly rapid.

Most diarrhea preparations are also recommended to soothe the restlessness of "teething" which, as we have learned to know, is likely to be made the object of narcotic applications. Here is a phrase taken verbatim from the label of a diarrhea mixture containing alcohol, ether, and opium—a somewhat unusual combination: "Are a most certain cure for summer complaints of children, for cramps, and convulsions in teething." The cruelty of a label advocating such narcotic application, by untrained persons, in cases of infantile convulsions due to whatever cause needs, I am sure, no comment.

The susceptibility of children to disease is not understood with the thoroughness which should come about through universal explanation. It takes a long time to be universal; and it has taken a longer time than is pleasant to contemplate, in spreading knowledge concerning the susceptibility of children in a special way to certain types of disease. Particularly is this true of rheumatism and its effects.

Beside the crippling of joint and muscle, the heart is very frequently impaired permanently by an attack of this disease; and the occurrence of chorea or, as we call it, St. Vitus's dance, in connection with rheumatism, is not at all uncommon. Neither heart disease nor St. Vitus's dance can be suitably treated by the home use of a proprietary. To attempt such treatment involves a grave injustice to the helpless victim, who must pay for it with months or years of sickness. The evils brought on by rheumatism are severe enough without the addition to their exquisiteness of a mode of neglect which permits their ravages practically full sway and a free hand.

Chorea or St. Vitus's dance is a diseased condition affecting the child's nervous system. Today there is not one of us who does not know of the lasting harm that easily results when nervous diseases are improperly cared for. In spite of this widespread knowledge, proprietary often lump together various nervous diseases which are not at all similar. Preparations are offered in wholesale fashion for the cure of convulsions, epilepsy, St. Vitus's dance, sleeplessness, and paralysis. Since certain forms of paralysis depend upon epidemic infection, and, as we have learned, since St. Vitus's dance is commonly associated with rheumatism—since convulsions vary greatly as to cause, and since epilepsy is a most grave and persistent disorder—perhaps nowhere do proprietary appear more inappropriate, more cruel, more useless, and more terribly costly in a tribute exacted of sorrow, crippling, and

clouded futures, than in the field of nervous diseases.

They bear a special and peculiar relation to nervous disease in children from the fact that they so usually contain alcohol. I beg every mother who reads these words to remember this alcohol ingredient of the so-called "home remedy." Our scientists and students know that alcohol cannot be often applied to the developing nervous system of the child without great danger of inducing degeneracy, grave impairment of nervous tissue, and consequent conversion of the growing child into a more readily produced incompetent who offers serious chances of becoming a ward of the public institution and a handicapped unfortunate in the struggle for existence.

Certain products, not conspicuously of medicinal character, are sometimes offered for weakness, rickets, or general debility (whatever that very indefinite term may mean) under the plea that they are foods and good for convalescence, poor nutrition, or whatnot. If these articles contain alcohol, their use cannot be regarded as being free from danger to the helpless beings who may be dosed with them. Beer, ale, porter, and other alcohol containing liquors should be considered unfit for use with the growing child. Every nervous system in the United States will probably get more alcohol than it ought to get; to begin by early subjecting the child to this harmfully toxic influence is against every principle of the most simple and reasonable hygiene.

If alcohol is a narcotic incidental, as we have seen, in various amounts, as

a frequent ingredient of the proprietary, we should understand that it happens thus generally to be employed because it is a convenient solvent or preservative of other ingredients which may be present. Though it exists in all proportions up to 80 per cent. or higher, it is seldom employed directly for its particular narcotic effect. Not so is the case of the coal tar products.

These are used most largely in headache powders, tablets, or mixtures. Acetanilid is the most common. There are certain derivatives of this drug, such as phenacetin, which also tend to benumb and dull sensation, and there are other drugs which, technically, may not necessarily be derivatives of acetanilid, although none the less harmful. Antipyrine and similar products should be considered harmful and not without danger to the frequent user.

These drugs affect the blood, depress the heart, and may produce sudden death if used to excess in quantity or frequency. Caffeine is sometimes combined with depressant drugs in an attempt to counteract their harmful action; however, their unfortunate effects cannot always be forestalled in this way.

To the mother who feels inclined, mostly through mere failure to inform herself, to dose her children with proprietaries, there are available some means of assistance of which she ought to be aware. Nowadays public health representatives are, more often than not, accessible and willing to indicate helps and to point out wrong or harmful practices. Mothers who dwell in our large cities may, if they wish,

receive much assistance from various school authorities. Not only are most modern teachers capable of indicating disease, but in many cities there are well elaborated systems of school inspection. Large cities are better off in this respect than small, remote, and rural communities.

Let the mother do her best to find out what is the matter with her child instead of blindly depending on the use of a proprietary. Let her learn to notice, or to bear in mind, possible defects of vision or hearing. Let her learn to be on the lookout for discharging ears, for mouth breathing, nervous symptoms, and weak heart. Let her understand that enlarged glands, defects of teeth, or limbs, or attention, the presence of obscure pain, and the hidden results of communicable diseases are subjects neither

for neglect, for natural evolution, for punishment, nor, lastly, for ready made treatment with shelf goods, but that they require investigation.

Coöperation with the means which, today, are in most cases available to the mother who would seek information, will effect substantial happiness and relief, which will be reflected in the worldly careers of the children for whose benefit such means may be sought out and applied. The net result is bound to appear in a broader and surer use of the principle of prevention, which, simple as it is, comes to be understood only at a cost in life and pain. So far as proprietaries are concerned, they appear to be capable of causing less trouble today than yesterday; and perhaps it is not a mistake to conjecture that they will cause less trouble tomorrow than today.



THE "GRIP" EPIDEMIC OF THE WINTER OF 1915-1916.

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EARLY last winter the country experienced a severe epidemic of what was popularly called "grip." It started in December and reached its height in the middle of January. The disease seems to have swept the entire land, moving from west to east. The duration of the epidemic in any one locality was from six to eight weeks. It is not an exaggeration to state that in certain cities from 40 to 50 per cent. of the population was affected. As a result the general death-rate was appreciably increased, and this made itself especially felt in a markedly higher mortality from lobar pneumonia.

The profound influence of the epidemic upon the mortality of the country may be seen in

the returns already at hand from some of our largest cities. The following table shows the number of deaths from influenza and pneumonia in six cities for the two months December, 1915, and January, 1916, as compared with the corresponding period in the previous year, December, 1914, and January, 1915.

In 1915-1916, the number of deaths from influenza in this group of cities was increased more than sevenfold in comparison with 1914-1915. Apparently the most marked change occurred in Cincinnati, but without exception there was a marked rise in the number of deaths in every one of the cities. Pneumonia also shows a striking increase. In Baltimore and Philadelphia the number of deaths was about

TABLE I.
MORTALITY FROM INFLUENZA AND
LOBAR PNEUMONIA, DECEMBER,
1914-JANUARY, 1915, AND DECEM-
BER, 1915-JANUARY, 1916: SELECTED
CITIES OF THE UNITED STATES.

City.	Deaths from influenza.		Deaths from lobar pneumonia.	
	Dec. 1915- Jan. 1916.	Dec. 1914- Jan. 1915.	Dec. 1915- Jan. 1916.	Dec. 1914- Jan. 1915.
Total	1,091	143	3,021	1,733
Baltimore	57	12	219	110
Cincinnati	81	2	105	84
New Orleans	97	44	35	29
New York City	494	62	2,067	1,207
Philadelphia	324	20	564	272
Providence	38	3	31	31

100 per cent. in excess of that of the previous year, and in New York City the increase was only slightly less.

The effect of this epidemic is similarly shown in the mortality experience of the Industrial Department of the Metropolitan Life Insurance Company. This covers the entire country and embraces a population of 10,000,000 persons. In December, 1914-January, 1915, the number of deaths from influenza was 165; in the same two months of 1915-1916 the number was 957. The corresponding figures for lobar pneumonia was 1,468 and 2,563 respectively.

Table II gives the weekly returns for influenza and lobar pneumonia in the six cities above mentioned and in the Metropolitan experience for December, 1915-January, 1916, as compared with the same months of the preceding year.

The number of deaths from influenza increased steadily throughout December, reaching a maximum in both experiences in the third week of January. The number of deaths from lobar pneumonia reached a maximum in the second week of January in the six cities, and in

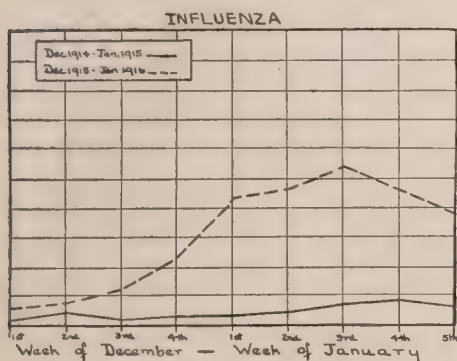
TABLE II.
MORTALITY FROM INFLUENZA AND LOBAR PNEUMONIA, IN DECEMBER, 1914-
JANUARY, 1915, AND DECEMBER, 1915-JANUARY, 1916, BY WEEKS: SELECTED
CITIES OF THE UNITED STATES AND METROPOLITAN LIFE INSURANCE COM-
PANY, INDUSTRIAL DEPARTMENT.

	Deaths from influenza.				Deaths from lobar pneumonia.			
	Selected cities.		Met. Life Ins. Co. Ind. Dept.		Selected cities.		Met. Life Ins. Co. Ind. Dept.	
	1915- 1916.	1914- 1915.	1915- 1916.	1914- 1915.	1915- 1916.	1914- 1915.	1915- 1916.	1914- 1915.
December								
1st week	24	8	13	3	196	172	159	158
2d week	28	14	12	8	219	182	141	151
3d week	44	6	30	10	259	154	170	142
4th week	91	11	40	12	378	144	235	89
January								
1st week	172	12	98	20	431	204	336	163
2d week	185	15	160	26	448	239	348	226
3d week	214	25	209	26	402	240	426	181
4th week	182	31	204	31	382	213	390	196
5th week	151	21	191	29	306	185	358	162

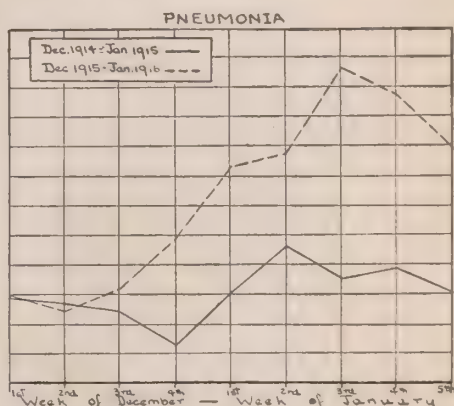
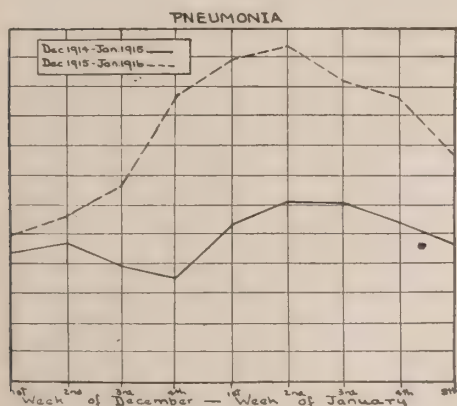
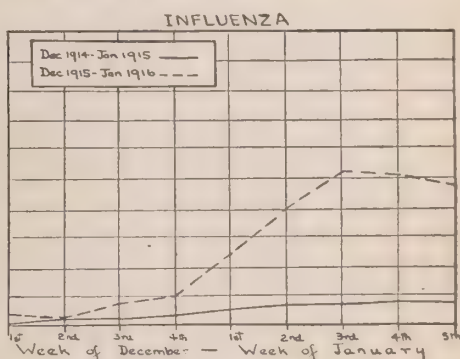
the third week of that month in the insured group. In this week there were 426 deaths from lobar pneumonia among the insured, as against only 181 in the previous year—a difference of 245. Thereafter the number of deaths from

both diseases shows a fairly rapid decline. The parallel increases and decreases from these causes in the cities and in the insurance company are rather remarkable and are shown clearly in the following graphs.

NUMBER OF DEATHS FROM INFLUENZA AND PNEUMONIA, SIX LARGE CITIES* OF THE UNITED STATES, WEEKS OF DECEMBER 1914-1915 AND JANUARY 1915-1916.



NUMBER OF DEATHS FROM INFLUENZA AND PNEUMONIA, INDUSTRIAL DEPARTMENT, METROPOLITAN LIFE INSURANCE COMPANY, WEEKS OF DECEMBER 1914-1915 AND JANUARY 1915-1916 COMPARED.



* Baltimore, Cincinnati, Philadelphia, New Orleans, New York, Providence.

BACTERIAL COUNTS IN WATER EXAMINATION.

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DURING the early part of 1912 the author made a number of experiments in the laboratories of the Toronto Filtration Plant with the object of determining what was the most suitable media that might be used for making bacterial counts of the various waters examined. These experiments extended over a period of six months and cover various seasons but are not as extensive as could be desired. A change of appointments, however, brought them abruptly to a close and until now no opportunity has been afforded of preparing these results in a form fit for publication. The recent criticisms of Whipple, Baton, and others of the report of the Committee on Standard Methods of Water Examination of the American Public Health Association has once again brought this subject to the fore and the author takes this opportunity of presenting his results in the hope that they may aid in reaching a solution of this difficult problem.

The majority of the samples examined in the laboratories were in connection with the filtration plant and consisted of raw and filtered waters, but as a chlorinating plant was also being supervised it was important that chlorinated waters should also be considered. The object of the experiments was not to ascertain what media would show the largest percentage purification effected by the filters but to select

a medium which would most effectively and speedily determine the sanitary value of the various waters submitted for examination. The various points considered in this connection were:

- (1) Agreement with *B. coli* results.
- (2) Time required to obtain results.
- (3) Delicacy.
- (4) Convenience.

It seemed to the author that the primary essential was to correlate the results with the *B. coli* figures, as it is largely upon these latter that the bacteriological evidence of the sanitary value of a water is based. While acknowledging the weakness of this basis, it was used on account of the total inadequacy of all others that have been suggested. The time required for securing results is obviously of the first importance if the results are to be of practical utility. Delicacy and convenience are of minor importance.

At first nutrient gelatine at 20°C., agar at 37°C. and mixtures of agar and gelatine at 20°C. were employed but various changes were afterwards deemed advisable and effected.

GELATINE.

The first experiments were in connection with the preparation of a gelatine medium that would reproduce as large a percentage as possible of the bacteria present, and possess a melting point above the temperature at which a well-regulated incubator can be

maintained. Four brands of gelatine such as are ordinarily sold for bacteriological purposes were secured and made into media according to the usual method with beef infusion and peptone and adjusted to +1 per cent. reaction. A preliminary trial on various waters (10 samples) gave approximately the same average results, so the melting points and acidities were then determined.

These are shown in Table No. 1 and Diagram No. 1.

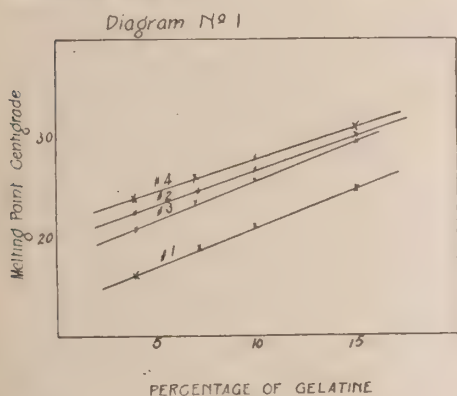


TABLE NO. 1.
ACIDITY AND MELTING POINT OF 10
PER CENT. GELATINE SOLUTION.

Gelatine.	M. P. Cent.	Ccm. of N. NaOH per 100 cc. of solution.
No. 1.....	21	26
2.....	26.5	20
3.....	25.5	21
4.....	27.5	18

A mixture of gelatine and water does not show a melting point in the true physical sense, *i. e.*, a change of physical phase accompanied by molec-

ular re-arrangement but the melting point can be fairly accurately determined and is usually proportional to the concentration.

As the method of preparing and sterilizing gelatine was usually found to reduce the M. P. 2° – 3° C., the effect of prolonged heating under pressure was studied with the following results.

CONTACT TIME IN HOURS AT TEN POUNDS
PRESSURE.

	0	1	2	3	4
Melting point.....	27.5	24.5	22.0	20.0	18.0
Acidity.....	18.0	20.0	21.5	23.0	24.5

Prolonged heating reduces the melting point by hydrolysis of the gelatine with the production of amino acids and other substances of an acid nature. Heating to about 140° C. was found to entirely destroy the property of "gelling" on cooling.

A final choice between Nos. 1 and 2 was effected by plating out 30 samples on each medium made from these brands. The results showed an average difference in favor of No. 1 of 5 per cent. with a variation of ± 15 per cent.

No. 1 was finally chosen, and incidentally it might be mentioned that it was the most expensive of the brands experimented with.

Although fresh beef infusion is usually recommended as the source of meat bases, a comparison was made between media made with this infusion and one made with concentrated meat extract. Lemco in the proportion of 3 grams per litre was used.

The averages of a number of determinations were:

Beef infusion.....1,318 bacteria per ccm.
Lemco.....1,570 bacteria per ccm.

As there was just as much probability of obtaining lemco of constant composition as of securing the same quality of beef, the former was substituted for beef infusion in all the media subsequently prepared. Lemco also possesses the collateral advantages of being cheap, easily stocked, and procurable almost everywhere.

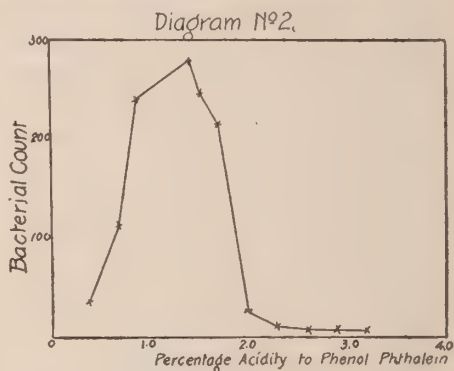
REACTION.

The optimum reaction of media has been the object of much experimental work with the result that +1 per cent. has been adopted as the standard reaction. With the idea of confirming this for the particular waters under examination 12 batches of media were prepared and the theoretical amount of alkali was added so as to adjust the reactions to vary from neutral to +3 per cent. After clarification and sterilization the acidities as determined were found to be in excess of the theoretical, this tendency being excessive in the batches of lowest acidities. In fact it was afterwards found impossible to prepare a neutral medium without the addition of most abnormal quantities of alkali.

About 40 samples of water from various sources were plated out on these 12 lots of media with the results shown in the following diagram. The bacterial counts as recorded are the averages of the numbers of colonies per plate and not the number of colonies calculated to a constant unit volume of water such as 1 ccm.

This seemed to be the best method available when waters of widely dif-

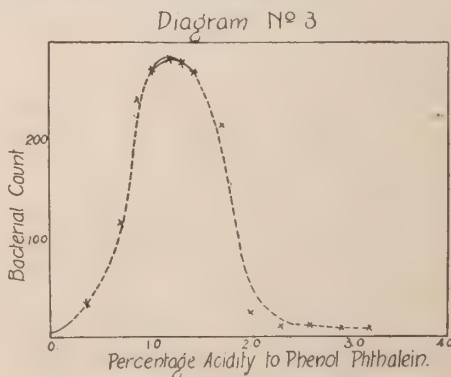
fering bacterial content were examined; the bacteria per unit volume method is objectionable in such cases as two or three samples with high counts may dominate the character of the average of the whole series.



As the acidities showed a gap of considerable dimensions at about the optimum reaction, four further batches were prepared to supply intermediate points. The acidities and counts were:

Acidity.....	+1.00	+1.15	+1.30	+1.40
Count.....	435	448	445	432

As one acidity (1.40) was common to the two series, either series could be expressed in terms of the other and the curve completed. This was done and is shown in the diagram.



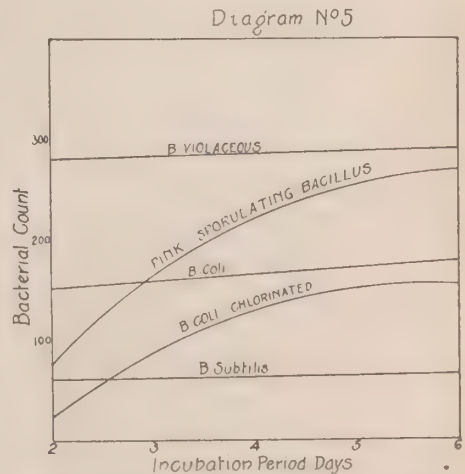
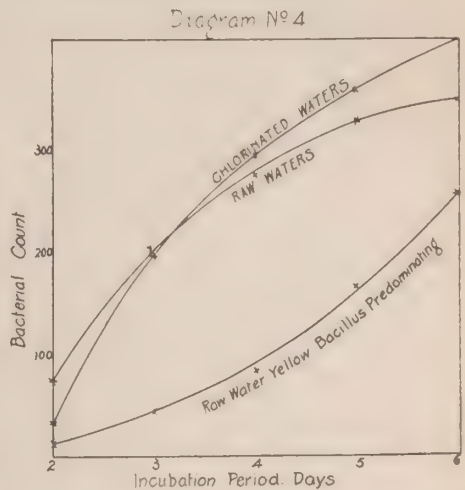
These results give an optimum acidity of +1.1 per cent. but the difference shown by reactions between +1.00 per cent. and +1.40 per cent. is so small as to be within the limit of experimental error. All gelatine media afterwards prepared were adjusted to give a theoretical reaction of +1.00. This acidity together with the small amount developed during sterilization gave a final reaction of +1.10 per cent. to +1.20 per cent. which is the optimum found in the above experiments. A point worthy of mention is the importance of using fresh medium. Gelatine medium, although quite sterile, increases slowly in acidity even when kept in the ice box. The increase is usually sufficient in about three weeks to vitiate the results obtained with it.

INCUBATION PERIOD.

The period of incubation allowed for the development of colonies on plates of nutrient media varies considerably in different countries. In America, 48 hours is usual for room temperature counts; English practice is to count on the third day, while in France and Germany incubator periods up to 14 days are not unusual.

With a view to ascertaining what advantage, if any, is to be obtained by prolonging the incubation period beyond 48 hours the gelatine plates of a large number of samples were counted 2, 3, 4, 5, and 6 days incubation. Longer periods were not attempted on account of the lack of incubator space. The results obtained with the various classes of water usually examined together with those from various pure

cultures of bacteria are given in Diagrams Nos. 4 and 5.



These curves show several features. That

(1) An appreciable increase in count occurs with increased incubation period of ordinary water samples.

(2) Chlorinated waters show a relatively larger increase than raw waters; this is also true for chlorinated pure cultures.

(3) The rate of reproduction of many species of bacteria is sufficiently rapid for almost all of them to produce visible colonies on gelatine within 48 hours.

The increased count obtained by prolonging the incubation period of raw and filtered waters is appreciable but it is doubtful if the increased delicacy so obtained is commensurate with the disadvantages inherent to this procedure. With chlorinated waters the increase during the third day of incubation is relatively larger and is so pronounced that it seems advisable to take account of these bacteria whose rate of reproduction has been retarded. These bacteria have possibly no sanitary significance but until that can be conclusively proved, the safe attitude is to include such bacteria in the usual count. The increase per day after the third day's incubation is much smaller than that observed during the third day and may be neglected.

The pure cultures used, with the exception of the pink sporulating bacillus, showed very little development after 48 hours' incubation. This seems to be characteristic of many bacteria of the mesophyllic group; psychrophyllic bacteria, on the other hand, as illustrated by the raw waters in which the "yellow organism" predominated, show a delayed development.

From theoretical considerations, the average rate of bacterial reproduction ought to vary, other conditions being equal, with the difference between

the temperature of the body of water sampled and the incubation temperature. That this variation in the reproductive rate can be nullified to some extent by an increased incubation period is shown in the above diagrams.

From this hypothesis the maximum count should be obtained at an incubation temperature identical with that of the body of water from which the sample was obtained, and, as a further corollary, it might be stated that the ratio of the total bacteria to *B. coli* in water whose temperature is changing can never be constant when the total bacteria are determined by development at a fixed and constant temperature which is not the optimum temperature for *B. coli*.

If *B. coli* or excremental organisms in general were the only ones found in water capable of growing at blood heat it might fairly be expected that the count at 37°C. would bear an approximately constant relation to the *B. coli* content. This was the basis of the blood heat count but whether it bears any more definite relation to the sanitary value of a water than does the count at any other temperature still remains to be proved. This point will be referred to again later.

In the following tables the bacterial counts at various temperatures are given, together with a comparison of gelatine and agar with different incubation periods and also a number of comparative counts on gelatine the melting point of which had been raised by the addition of agar.

TABLE 2.

AVERAGES OF BACTERIAL COUNTS ON VARIOUS MEDIA. RAW WATER.

Date, 1912.	Raw water.											Typical B. coli index per ccm. x 100.
	Gelatine 20°C.		Agar 20°C.		Agar 37°C.			Agar 27°C.				
	2 days.	3 days.	2 days.	3 days.	1 day.	2 days.	3 days.	1 day.	2 days.	3 days.		
Jan. 5-31.....	315	2,017	388	923	27.2						24.7	
Jan. 17-31.....	447	2,418	437	1,263	57.2	80.1	92.5				18.5	
Feb. 1-29.....	3,390	19,232	1,109	4,186	37.6	96.4	382.0				94.9	
Mar. 1-30.....	10,151	17,263	1,267	6,940	20.4	56.7	65.8				19.7	
Apr. 1-30.....	5,938	18,524	1,666	5,498	31.5	60.4	81.2				151.5	
Apr. 12-30.....	3,827	13,441	1,528	5,881	31.9	58.4	94.6	426	1,453	2,166	108.2	
May 1-31.....	797	3,839	414	2,368	17.0	37.4	44.4	274	769	1,426	54.2	
June 1-2.....	334	1,225	103	209	8.6	24.4	31.3	43	231	320	10.9	

TABLE 3.

AVERAGES OF BACTERIAL COUNTS. FILTERED WATER.

Date, 1912.	Filtered water.														Typical B. coli per ccm. x 100.
	Gelatine 20°C.		Agar 20°C.		Agar 37°C.			Agar gelatine 20°C.				Agar at 27°C.			
								0.4% agar.		0.8% agar.					
	2 days.	3 days.	2 days.	3 days.	1 day.	2 days.	3 days.					1 day.	2 days.	3 days.	
								2 days.	3 days.	2 days.	3 days.				
Jan. 15-31 ...	90	378	74	171	2.3	4.5	5.5	57	138	57	126				6.4
Jan. 5-31	113	408	71	144	3.0										6.3
Feb. 1-10....	189	854	177	537	5.3	18.0	19.5	33	131	26	61				13.5
Feb. 1-29....	653	2,273	413	1,528	10.0	23.1	37.0								6.8
Mar. 1-30....	261	1,631	84	884	1.2	2.88	9.3					16.5	50.2	91.4	7.9
Apr. 1-30....	117	821	97	533	6.0	8.9	11.5					18.3	67.5	102.0	12.3
May 1-31....	43	246	27	126	2.8	5.4	6.8					10.4	30.0	64.0	9.6
June 1-29....	20	86	9.2	23	1.4	3.3	4.4					4.2	14.0	26.0	.16

Agar.—This was made according to the formula:

Dried agar.....10 gms.
 Witte's peptone.....10 gms.
 Lemco.....3 gms.
 Water (distilled).....1,000 ccms.
 Reaction.....+1 per cent.

The medium was "cut" with egg albumen and sterilized under pressure.

Gelatine-Agar.—This was prepared as is recommended above for nutrient gelatine with the addition of 0.4 per cent. and 0.8 per cent. of agar respectively to the two batches.

TABLE 4.
RATIO OF COUNTS ON VARIOUS MEDIA. RAW WATER.

Date.	Raw water.												Temperature degrees Fahrenheit.
	Ratio of B. coli index per ccm. x 100 to						Ratio.						
	Gelatine.		Agar 20°C.		Agar 27°C.	Agar 37°C.	Agar 37°C.			Agar 27°C.	Agar 20°C.		
	2 days.	3 days.	2 days.	3 days.	24 hours.	24 hours.	24 hours to gelatine 3 days.	24 hours to agar 20°C. 3 days.	24 hours to agar 27°C. 24 hours.	24 hours to agar 20°C. 2 days.	2 days to gelatine 2 days.	3 days to gelatine 3 days.	
Jan. 5-31...	1:13	1:82	1:16	1:37		1:1.1	1:74	1:34			1:0.8	1:2.2	34.5
Feb. 1-29...	1:88	203	12	44		0.40	512	111			7.5	4.6	33.0
Mar. 1-30...	1:516	876	65	352		1.07	856	341			8.0	2.5	33.7
Apr. 1-30...	1:39	125	11	36		0.20	587	174			3.6	3.4	35.4
Apr. 12-30...	1:36	124	14	55	1:3.9	0.30	422	184	1:13.1	1:0.95	2.5	2.3	
May 1-31...	1:15	71	7	44	5.0	0.32	226	139	16.1	1.8	1.9	1.6	39.7
June 1-29...	1:31	113	9	19	3.9	0.79	142	24	5.0	2.2	3.2	5.9	42.6

TABLE 5.
RATIO OF BACTERIAL COUNTS. FILTERED WATER.

Filtered water.														Temperature degrees Fahrenheit.
Date.	Ratio of B. coli index per cem. x 100 to						Ratio.							
	Gelatine.		Agar 20°C.		Agar 27°C.	Agar 37°C.	Agar 37°C.			Agar 27°C.	Agar 20°C.			
	2 days.	3 days.	2 days.	3 days.	24 hours.	24 hours.	24 hours to gelatine 3 days.	24 hours to agar 20°C. 3 days.	24 hours to agar 27°C. 24 hours.	24 hours to agar 20°C. 2 days.	2 days to gelatine 2 days.	3 days to gelatine 3 days.		
Jan. 5-31...	1:18	1:65	1:11	1:23		1:0.48	1:136	1:48			1:1.6	1:2.8	34.9	
Feb. 1-29...	1:10	333	61	223		1.5	227	153			1.6	1.5	34.4	
Mar. 1-30...	1:33	206	11	112	1:2.1	0.15	1359	737	1:13.7	1:1.7	3.1	1.8	33.9	
Apr. 1-30...	1:9	67	8	43	1.5	0.49	136	89	3.0	1.4	1.2	1.5	35.4	
May 1-31...	1:45	256	28	131	10.8	2.9	88	45	3.7	0.9	1.6	1.9	39.9	
June 1-29...	1:125	538	75	144	26.2	8.7	61	16	3.0	0.6	2.2	3.7	43.7	

TABLE 6.
BACTERIAL EFFICIENCIES AS DETERMINED BY VARIOUS MEDIA.

Period, 1912.	Gelatine 20°C.		Agar 20°C.		Agar 37°C.			Agar 27°C.		
	2 days.	3 days.	2 days.	3 days.	1 day.	2 days.	3 days.	1 day.	2 days.	3 days.
Jan. 15-31.....										
Jan. 5-31.....	64.1	79.8	81.7	84.4	89.0					
Feb. 1-10.....										
Feb. 1-29.....	92.2	88.2	62.8	63.5	73.4	76.0	90.3			
Mar. 1-30.....	97.4	90.5	93.4	87.3	94.1	94.9	85.9			
Apr. 1-30.....	98.0	95.6	94.2	90.3	81.0	85.3	85.8			
May 1-31.....	94.6	93.6	93.5	94.7	83.5	85.6	84.7	96.2	96.1	95.5
June 1-29.....	94.0	93.0	91.1	89.0	83.7	86.5	86.0	90.2	94.0	91.9

These results show that

(1) Not one of the media used at any one of the incubation periods or temperatures chosen gives a bacterial count that bears a constant ratio to the organisms of excremental origin as estimated by the *B. coli* test.

(2) The most constant ratio is given by different methods for different classes of water.

(3) The blood heat count is the nearest to the *B. coli* content.

(4) The largest count is obtained by the use of nutrient gelatine.

(5) The bacterial count varies directly with the incubation period and inversely with the incubation temperature.

(6) The largest count in the shortest incubation period is obtained at 27°C.

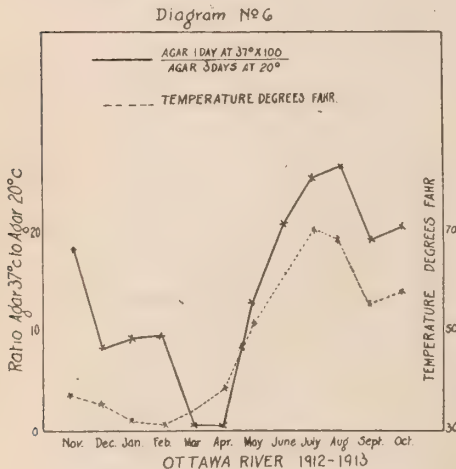
(7) The ratio of the count at a given temperature to the count at a higher temperature decreases as the temperature of the water increases.

Almost the whole of these conclusions could be deduced from the theoretical hypothesis enunciated above.

As none of the methods used fulfill all the requirements most desired for water examination, it remains to choose the method or methods that will approximate most closely to them. For delicacy gelatine is undoubtedly the most suitable but on account of its general inconvenience it leaves much to be desired. Nutrient agar after incubation for three days at 20-22°C. shows approximately the same delicacy as gelatine with 2 days' incubation and as it is not subject to the same disadvantages as regards liquefaction it would seem to be more desirable.

Although the blood heat count ought, from theoretical considerations, to be the most suitable, and especially so as excremental organisms produce a visible colony on nutrient agar within 24 hours, it has been found in practical use to be a failure. The excremental organisms are usually but a very small proportion of the total organisms developing at blood heat, and this count is thus influenced by factors which have no sanitary significance.

The following diagram, prepared from the author's Ottawa results, shows the influence of water temperature upon the relation of the counts at different temperatures and confirms the deduction (No. 7) from the Toronto results. This has also been pointed out by Whipple.



Of the rapid methods experimented with, the 27°C. count seemed the most promising, as the ratio to *B. coli* was about as constant as that of any other method and the results showed greater delicacy than the blood heat method. The total number of results are, however, too few to warrant making a definite recommendation in favor of a method which is more or less an innovation. The temperature 27°C. was chosen as it was found to be just above the death point of the yellow bacillus, a psychrophyllic organism which is the bane of so many purification plants in cold weather. The percentage purification of the filter effluents calculated on the 27°C. count approximates

fairly closely with that calculated from the gelatine results, and should therefore prove satisfactory in this respect, as the results would not need to be interpreted for comparison with those obtained by methods previously in use. However satisfactory this method may seem to be in practical utility, the fact remains that it is unsound theoretically as a method for determining the sanitary value of a water. The *B. coli* basis as a gauge of the purity of a water undoubtedly leaves much to be desired, but as it has been established as a standard practically universal and as there seems to be no prospect of any other method supplanting it in the near future, our efforts ought to be directed towards the establishment of a method that will determine the *B. coli* content with greater accuracy than is possible with the methods at present in use. The chance errors of distribution render the enrichment method mathematically inaccurate unless a large number of tubes are used or the average calculated from a number of samples. As at present the plate enumeration method can be employed with as much as 10 cc. of water, there is no reason why a solid medium should not be used entirely for this work, larger quantities than 10 ccms. being concentrated before plating. The author has been experimenting along these lines for a considerable length of time but at present the results do not warrant publication. Even if success be at first denied he is convinced that some such method will ultimately become general in routine water examination.

PUBLIC HEALTH PUBLICITY: THE ART OF FOCUS- ING PUBLIC OPINION.

EDWARD A. MOREE,
Director Atlantic Division American Red Cross.

IV. Newspaper Publicity.

A CUB reporter in a certain medium sized city, faced with the bread and butter necessity of making good on a new job, started an exploring expedition in City Hall, which was part of his beat. Against the advice of older and more experienced men he added the office of the Department of Health to his tour.

The older men averred that they had never been able to squeeze any news out of that department. They never got anything unless it was a long technical speech by the health officer, which no newspaper would ever think of printing, and which no one would understand if it were printed.

One morning, however, an employee of the department carelessly dropped a hint in the presence of the persistent cub that there was an epidemic of measles in a certain school. With the hint came the admonition that nothing should be printed about it.

This new reporter had ideas of his own as to the responsibility of a health department to the people of the community. Heretofore he had never been able to break into the cast iron secrecy of the official sanctum.

"Reporters never get anything straight and I won't see them," was the office order from the chief. This time the reporter insisted and his

remarks to the health officer ran something like this:

"I understand that there is an epidemic of measles in School No 28. Your office gave me the information and told me not to print it. Unless I get your permission to print it I will not do so. I believe, however, that the people of this city, whose taxes support this department, have the right to know of any unusual developments affecting the community's health, especially when the health of their children is involved. You say you fear public hysteria at the mention of an epidemic. I doubt if that will happen. If it does, will it not be due to the policy of secrecy which has maintained in this department for years? This has made both the newspapers and the people of the community suspicious. Isn't it possibly true that what they fear is not the conditions reported, but that your department has told only half the truth? We reporters have come to think that if you admit a small epidemic we must multiply it considerably in order to arrive at its real size. If what the older men tell me is true, you will agree that there is some basis in their dealings with this department, for their feeling.

FRANK PUBLICITY.

"I would like to suggest that for a short experimental time you adopt a new policy of full and frank discussion of the city's health conditions; that you preface this by permitting me to tell the facts about this epidemic and about the polluted water supply and announce on your behalf that the people of the community are entitled to know the conditions of the city's health; that the policy of the department hereafter, will be one of frank publicity in this regard."

"But," expostulated the health officer, "your paper is politically opposed to me. They will not treat fairly anything that I have to say."

"The policy of my paper," replied the reporter, "so far as health is concerned, is entirely neutral. The editor and the city editor, however, feel that you never have treated newspapers fairly; that you never have given news unless you were absolutely forced to do it; that we, in order to present news, are frequently forced by your policy of silence to rely upon untrustworthy information which you will deny only after it has been printed. This puts the newspaper in a false light. In short, we feel that you fail to take advantage of one of your most potentially powerful allies—the press of the city."

"Mr. Health Officer, I wish that you would let me try to prove to you, in my own way, that what I am saying is true. First, let me print this story about the epidemic of measles, warning parents not to send their children to school if they have colds in the head,

or other early symptoms of measles. Second, let me inform the public on your authority, that there is no danger of the disease spreading to other schools if proper precautions are taken in School No. 28. Third, let me announce that it will not be necessary to close the schools* if the parents, teachers and physicians knowing of cases of measles cooperate with the department in securing their isolation, especially those in the early stages.

"So much for the epidemic of measles. Now I have another plan to prove my theory. The next time you want anything in your department let the *Star* undertake a campaign for you. Give me all the information you can, and let me work it up into interviews. Then let us go to bat for you."

DISCOVERED A HEALTH DEPARTMENT.

The result of this conference was that the story of the epidemic of measles was printed as the reporter desired and the newspaper men found that they could not afford to neglect this department. The health commissioner adopted the plan of seeing them at a certain hour every morning and under the guidance of his friend, the cub, usually has something interesting to offer. The cub to prove his theory made carbon copies of all his own stories and permitted the health officer to give copies to all the other men. Ample opportunity was given the reporters to ask questions on any subject.

*This occurred during the period when the closing of schools in an epidemic was thought to be the only way of controlling them.

Released for Sunday, January 2d

This story is furnished to you free by the Russell Sage Foundation, 1 Madison Avenue, New York, on the understanding that it be not published until Sunday, January 2. You may then make such use of it as you desire. It is exclusive to you in your territory.

Modern Business Pace Not Necessarily Fatal

Dr Luther Halsey Gulick, of the Russell Sage Foundation, takes novel view of the speed at which men and women live their lives today

NEW YORK, January 1. A new view of the speed at which American men and women live their business and social lives taken by Dr Luther Halsey Gulick, Director of the Department of Child Hygiene, Russell Sage Foundation, and former of Physical Education of the New York Schools. Dr Gulick, who is considered authority on the subject, says that "the pace is not necessarily kills" but is rather the pace more worth living. He points out that there are increased and increased on the vitality of American vitality with which to has also increased.

Dr Gulick was of this subject in the Russell Sage attitude of business valuation of the of great economic their me...

Gulick won't be

One form of sending out feature stories.

Soon the health officer announced that the city needed a visiting nurse. He had been unable to get the mayor to agree to the appropriation. The common council was hostile to the idea and the board of health, in the face of so much opposition, would not support him. All of the papers printed the health officer's statement, prepared by the reporter, but the *Star* made a special "play" on it and followed up the first article with several strong interviews by the health officer. It was

a *Star* "crusade." It took up the campaign with a vim, and printed not only interviews and opinions of physicians as news, but through its reportorial staff stimulated the interest of the women's clubs, civic organizations, labor unions and even churches.

The result was that in less than three weeks the board of health put in a request for a visiting nurse and the board of aldermen made the appropriation.

A more important result than this, however, was achieved. The newspapers of the city had discovered that their health department was a source of news. The health officer became a complete convert to the publicity idea. The *Star*, which had been a most bitter opponent, became the health officer's staunchest supporter, and shortly after this, when the politicians tried to oust him, it took the lead in opposing the bosses of its own party.

This incident actually took place.

HOW TO PAY FOR PUBLICITY.

The announcement of this article stated "You must pay for your publicity whether you get it free or not."

The health commissioner in the above episode paid for his publicity by his frank dealings with the newspapers, and by trying to supply them with the kind of information that would make news. The extremely gratifying results from the health officer's point of view were no greater than can be achieved under similar circumstances by any department of health, either state or local.

The big outstanding feature of that

official's experience is this: He had the good judgment to accept the advice of a news specialist in a field where he knew he had failed. Instead of trying to "buck the game" he learned the rules. Better still, however, he put his interests in the hands of one who, even though relatively new to the business had the news sense and knew the fundamentals of his profession.

There are few public officials who at one time or another do not feel that they are mistreated or misunderstood by newspaper reporters. Of course there are rascally newspaper men—just as there are malpractitioners in the medical profession. The big run of them, however, honestly wish to present the facts and are grateful for assistance in securing them.

They are always pressed for time. Three o'clock, when the last edition goes to press, is bound to arrive and other departments than yours must be covered. An off-hand refusal to discuss water pollution or a typhoid epidemic may send the harassed reporter to someone who may not know the facts or who may be interested in distorting them.

Now truly, wasn't that just about what happened the last time you were misquoted, or misinterpreted or misunderstood by the newspapers of your city?

When you talk to that yellow-headed, freckled-nosed little Scotchman whom you detest so heartily, remember that you are talking to the thousands of readers who will not see the object of your dislike and judge of what he writes as you judge him.

They will get, however, his reaction to your dyspeptic utterances embellished by the headlines of the imaginative copyreader.

UNDERSTAND THE RULES.

In dealing with newspapers and newspaper men, one must understand some of the more general problems of journalism, both creative and me-

GORGAS IS FOR HOSPITAL PLAN

Noted Sanitation Expert Believes White Plague Can Be Stamped Out.

Rochester, Sept. 9.—Another busy day confronted delegates to the 43d annual meeting of the American Public Health Association, fifteenth annual conference of sanitary officers of the state of New York and seventh annual meeting of the New York State Sanitary Officers Association.

At the fourth session of the laboratory section papers were read by a number of health experts.

"In spite of all the work that has been done for the prevention of tuberculosis, that problem remains the largest and most important public health problem today," said General William C. Gorgas in response to the question, "What do you think should be the most accentuated phase of health work for the next five years?"

is like our yellow fever in Havana and the Isth-

Thousands of newspapers used this because it was prepared in newspaper style.

SOCIAL SHARPS FIND CENTRE OF SOCIETY

**It's Somewhere in Asphalt of
Fifth Avenue, Between 66th
and 67th Streets.**

Somewhere on Fifth Avenue between Sixty-sixth and Sixty-seventh streets lies the Koaba of the social climber's Mecca—the exact centre of population of blue-blooded New York. This

"Social Register" has established approximate location. Every living on this block probably claims the unquestioned

Among the
spiriting a
Million
nine
in

You can get news out of even a list of names if you "know how."

chanical, if he is to avoid the pitfalls that beset the public official in the public press. By far the simplest method of bringing this understanding into a department of health, is to employ a man or woman to do publicity work, who has had actual newspaper experience. As I have tried to point out repeatedly in the previous articles, stimulating and focusing public opinion is an art, and although it is a new art, its principles are fairly well defined, and must be taken into account by all those who would find publicity salvation.

This is especially true of newspaper publicity.

It is not always possible, of course, for a department to employ a person whose chief duties are the preparation

and circulation of newspaper articles. Unfortunately, many appropriating authorities look with suspicion upon a department that frankly seeks a publicity man. They see in this request an effort to coerce legislators; to force increased appropriations; to build up a political machine. A broader understanding of the need of this kind of work in health departments is bound to come, however, not only to the departments themselves, but to the appropriating authorities. Until this new understanding arrives, it will be necessary for departments to adopt make-shifts.

Frequently a person can be found among the staff of the department, who has had a little newspaper training in college. It is often possible to secure the volunteer services of a reporter. He might be made clerk of the board of health at a small salary. Occasionally it is possible to employ a reporter as an exhibit demonstrator. In other cases, it will be possible for a health department to utilize the services of a publicity man employed by a friendly health association.

With even the best of these plans, however, there still exists the pressing need for an understanding of the fundamentals of newspaper work by health officers. A visit to the newspapers of the city and a frank request for information will in every case be met by a full explanation of the workings of the newspaper plant.

A "MODERN MIRACLE."

Prof. John B. Opdycke in his admirable book entitled "News, Ads

and Sales" gives the following paragraph picture of the newspaper:

"The newspaper is a modern miracle. It has its real beginning in the spruce tree whose verdant green refreshes you when you are hot and tired. It comes into its own when, keen and cool, you find it by your breakfast plate in the morning. Of course it has undergone a change, a wonderful change. It has made a long and miraculous journey. In order that it may lie there before you, thirty acres of forest land have been denuded to get the fifty miles of extra-wide paper necessary for a single edition. But you have paid only a penny for it, and for this penny you have procured both a necessity and a luxury. The newspaper is almost as necessary as your food and clothing; and it is far more luxurious as a possession than anything on the table before you. Your orange may have come from California, your tea from Ceylon, your china from Japan, but your newspaper comes from all of these and a hundred other places every morning with intelligence. And more, that clean, ordered, well-Englished sheet that greets you, bears upon it the impress of an inventive genius that has been equaled in no other field of modern progress."

There are four departments of a newspaper: (1) editorial, (2) news, (3) business, and (4) mechanical. In the old days of journalism (and with some of the older or smaller papers of the present day) the editor-in-chief was either the owner or the chief stockholder of his paper. Modern newspaper production, however, has

SAYS CHARITIES PREY ON THE NEWSPAPERS

Tuberculosis Conference Told That Such Organizations Should Buy Space to Advertise Their Work

WOULD GET BETTER RESULT

E. A. Moree, representing the State Charities' Aid Association of New York, told a charities conference at the Bellevue-Stratford to-day that the newspapers never get a square deal, the uplift organizations which rely prey on them for help and support far greater than is elsewhere.

Mr. Moree suggested the attempting to filch away the valuable space which of life to a newspaper gangsters should follow.

A misinterpretation resulting from failure to prepare copy in advance.

PLEASE PUBLISH

LEGISLATION RELATING TO WESTCHESTER CO. WATERSHED

(From the Port Chester Daily Item.)

At the request of the editor of the Port Chester Daily Item, Senator George S. Slater, of this district, has written the following article explaining the bills introduced in the Legislature by representatives of New York city, regarding the watershed and its use, in the interest of the county, and his reasons for his opposition to them:

Several bills have been introduced in the Senate seeking to remove the New York State Training School for Boys and the Michigan State Hospital from the area selected heretofore for them by past administrations. There is also another bill seeking to amend the public health law to relate to protecting from pollution the watersheds used for the water supply. New York city thereby affects the land within the watershed of Westchester Putnam, Ulster and Schoharie counties lands elsewhere that by the City of New York supply.

The last map title to that effect for the "affected" lands is "City of New York."

A poor form for newspaper publicity.

NEWS DEPARTMENT

STATE CHARITIES AID ASSOCIATION
105 EAST 72nd STREET
New York City

To the Editor:—
The facts in the following article, submitted to you for review, are
checked by the undersigned.

HOMER FOLGER,
Secretary.
E. A. MORSE,
Publication Director.

Released for publication, Monday, Dec. 20th.

Confusion in State Charities.

Delays and Overlapping Responsibility already
revealed by Commissioner Strong.

Trend is Constructive.

Representative of State Charities Aid Association
says Whitman Inquiry is unearthing valuable data.

New York, Dec. 19. "Delays and harassing inspections that accomplish nothing but confusion in the State's charitable institutions; inefficiency due to cumbersome machinery; commissions made up of ex-officio members, placing additional responsibility on state officials already loaded down with responsibilities and duties which they cannot neglect; and general overlapping of authority and responsibility have already been revealed by Commissioner Strong", said Mr. E. A. Morse, Assistant Secretary of the State Charities Aid Association today, in commenting on the investigation being made by Governor Whitman through a special commissioner appointed under the Moreland act.

Mr. Morse is attending the hearings before Commissioner Barong as a representative of the State Charities Aid Association. In his statement he summarized the results of the investigation thus far and expressed on behalf of the Association its approval of the investigation. Mr. Morse pointed out that the Association had for more than thirty years, through local committees and visitors, watched the development of the state's system of charitable institutions.

A neat press bulletin letter head.

become so highly organized that the day of that feature of "personal journalism" is rapidly passing. More frequently now you will find the editor-in-chief together with the managing editor or business manager and the other employees working for a board of directors. The editor-in-chief is always the head of the editorial department. He is usually the dictator of the newspaper's policy. He writes the most important editorials and directs the preparation and make-up of the editorial page.

The managing editor might be called the assistant editor-in-chief. He has general supervision over the news, both telegraphic and local. On

the smaller papers the offices of editor-in-chief and managing editor are usually combined. Under him are the telegraph editor, the city editor and the sporting editor. If the staff is very highly organized he will also supervise sub-editors for various departments such as the dramatic, literary and art and the woman's page and Sunday department.

Papers in the larger cities require various other editors such as a day city editor and a night city editor, night editor or news editor and make-up editor.

Under the day and night city editors and under telegraph editors are staffs of copyreaders. These men are often confused by laymen with proofreaders. They, however, deal with the copy before it is set up and not with proof. The copyreaders are responsible for the correction of mistakes in the copy turned in by reporters or as it comes off the wire; the elimination of all libelous matter; cutting down stories to meet the space requirements and finally writing the headline in the size and style determined, in general, by the city or telegraph editor. The reporters who interview you are not responsible for the headlines that sometimes distort what you say.

THE NEWS DEPARTMENT.

The reporter functions in the city department of the news end of the paper. On a morning paper he is given assignments by the day city editor and reports on the assignments and turns in his copy to the night city editor. On afternoon papers the

reporter gets his assignments from the city editor and also reports to him.

The assistant city editor is a most important part of the work of the city department. Upon him falls the duty of reading every newspaper published in the territory over which his paper circulates. He is responsible for culling from such papers all suggestions for news stories. These may be found in obscure death notices, classified advertisements or insignificantly displayed paragraphs. The assistant city editor makes out the assignment book. In this book go all possible assignments for the day. The book is then turned over to the city editor who determines which assignments of the many possible ones shall be covered and which reporters shall do the work.

For the preparation of this book the assistant city editor depends not only on the newspapers of the day, but also on additional information which he has been able to collect from previous newspapers, notices, invitations and "tips." He must keep an elaborate file for such information dating ahead often more than a year. He thus makes sure that he has information on all important events occurring within his territory. Meetings, dinners, birthdays of prominent citizens, weddings and conventions are all recorded in this way and come to the attention of the assistant city editor at the proper time.

ORGANIZATION OF A NEWSPAPER.

In dealing with a newspaper it would be well to keep in mind the above scheme of organization. We

would cause less trouble to the busy newspaper office if we remembered the following:

(1) EDITOR-IN-CHIEF

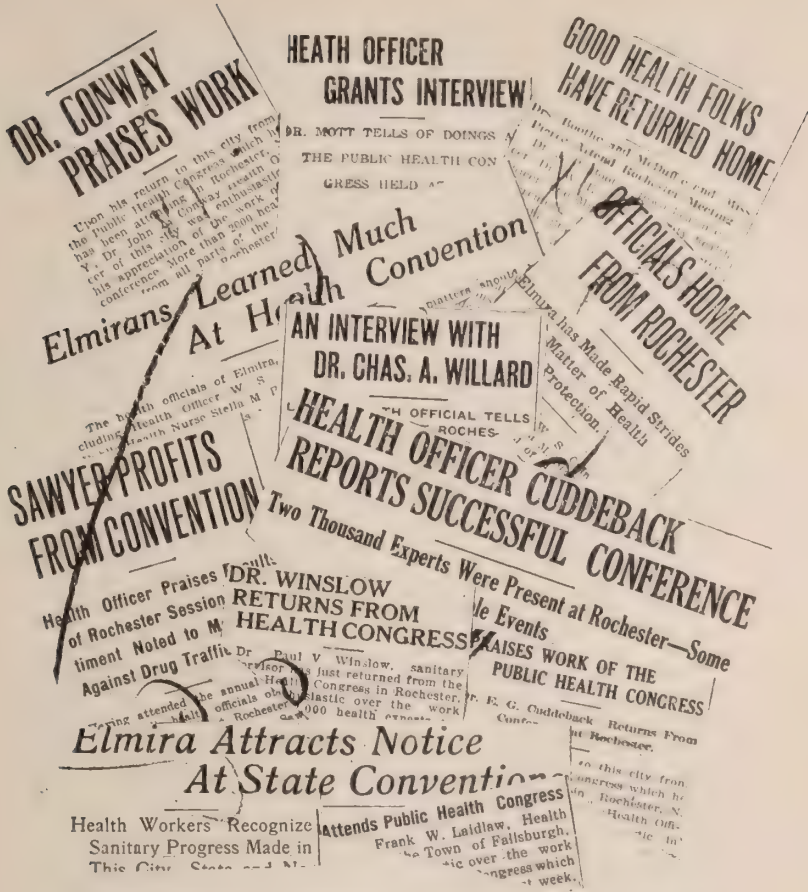
must be consulted on all questions of political, business, or social policy. Never bother the editor-in-chief with questions of detail that can be settled by any of the sub-editors. Never go to the owner of the paper to get him to coerce his editor. In the first place he will probably refer the matter to the man he has employed to deal with such questions, and, in the second place, if he does tell the editor what to do, you have lost a friend in an important place. If you win you lose. No one likes to be beaten on the head by his boss.

(2) MANAGING EDITOR

must be consulted on all news questions that do not fall readily into the telegraphic or city departments. Such questions as the extent of display for a coming convention or the assignment of a reporter to cover a legislative hearing, if they involve any changes of policy on the part of the newspaper, might go to the managing editor. If they were urgent, immediate matters, however, they would be settled by either the city editor or the telegraphic editor, according to whether they are local or foreign.

(3) THE CITY EDITOR

must be consulted on all local news. He is usually best reached through his assistant.



Some of the results of preparing interviews for returning delegates.

- (4) **THE ASSISTANT CITY EDITOR** should be informed of all future local events. He should receive invitations to meetings, dinners, conventions, etc., so that he may file the information that they contain for future use.
- (5) **THE TELEGRAPH EDITOR** should be informed of all occurrences outside of the jurisdiction of the city editor. Legislative hearings or conventions that are of local interest, due possibly to the fact that prominent local persons are to make addresses, fall in this class.
- (6) **THE WOMAN'S PAGE EDITOR** should be consulted in regard to articles relating to women's clubs or home interests.
- (7) **THE BUSINESS MANAGER** should be consulted on all matters pertaining to advertising.

WHERE TO TALK "BUSINESS."

The business office has no legitimate authority in the news or editorial departments. I have known of organizations that sought *entre* to news and editorial columns through the business office by using the influence of large advertisers. While you may get much space in this way, it ultimately will do your cause no good. If there is any one thing a newspaper man abhors more than another, it is being forced to devote more space to a story than its importance warrants because some advertiser has brought to bear outside pressure.

In general, it is true that your cause will prosper in proportion to your knowledge of the duties and responsibilities of the various department heads of a newspaper. This is particularly important in the case of the business manager. If you have advertising to give to a newspaper, talk your advertising in the business office. If you have a news story to give to the paper, go to the city editor and forget that you have left advertising in the business office. The respect for you and your cause which such a course will implant in the mind of the city editor, will be of greater value to you than any increased publicity which might come through urging your advertising as a reason for the grant of news or editorial space.

The mechanical department of a newspaper is a highly organized factory. It is different from most factories, however, in that there is a definite time limit on its product. It goes through exactly the same oper-

ations night after night, day after day, and its product becomes practically valueless five hours after the manufacturing process is completed. Like every finely-wrought piece of machinery, this factory, which is a combination of many finely wrought pieces of machinery and many high-strung, overworked human beings, one slight slip of any cog throws the whole machine out of tune.

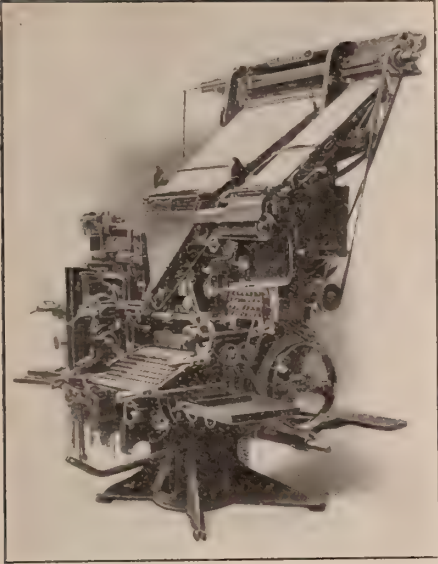
The first edition of a morning paper is the mail edition. One minute's delay in closing the forms means that the paper "misses the mails." Many a night editor has lost his job because the responsibility for losing the mails has been fixed upon him.

THE MECHANICAL DEPARTMENT.

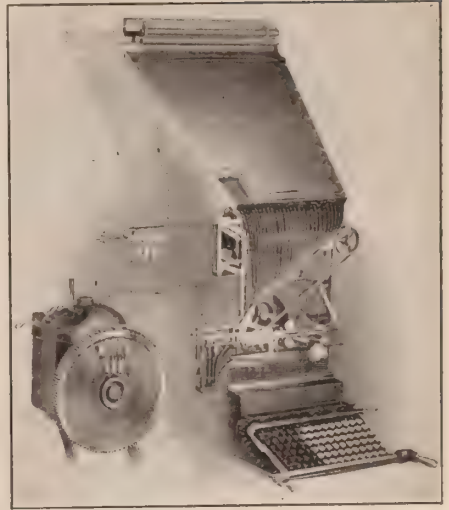
The mechanical department of a newspaper is generally divided into four parts: (1) the composing room; (2) the make-up, or stone room; (3) the stereotype plant, and (4) the press room.

Practically all of the composing of a modern newspaper is done on a linotype machine. This machine does not set type, but moulds lines of type in solid "slugs." These slugs are then transferred, together with the copy, to the proof press and the proof is struck off. The copy is then attached to the proof and sent to the proof room. The slugs, in short sections of columns, are then transferred to the correction bank. This is a series of long trays set in a steeply sloping bank.

After the proof is read, the corrected proof goes back to the machine operator who sets new lines of type to take



A Mergenthaler linotype machine.



Keyboard and distributing systems of linotype.



Newspaper battery of linotype machines at work.

Courtesy of Mergenthaler Linotype Co.

the place of the corrected lines. It may be well to remember that the taking out of one letter from a line in an article set by a linotype machine, means resetting a whole line. The

addition of a word to a line may mean the resetting of a whole paragraph.

The corrected lines of type come to the correction bank wrapped in the corrected proof. An experienced,

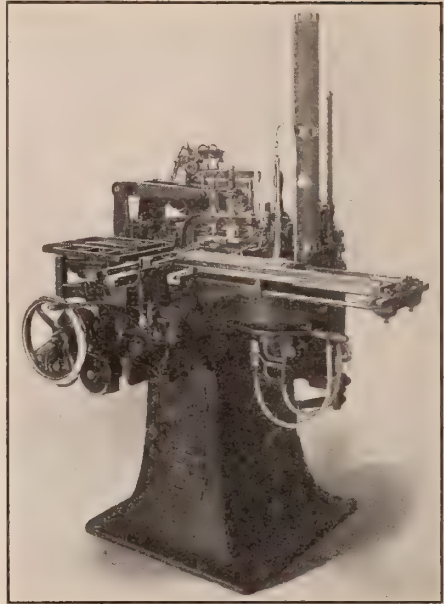


A bunch of slugs of linotype machine.

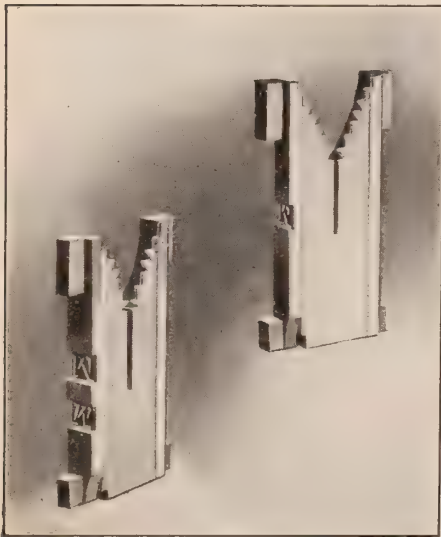
Courtesy of Mergenthaler Linotype Co.

rapid and accurate man stands at this bank and shoots the corrected slugs into their proper places, taking out the discarded slugs almost at one motion. On the correction bank also the additional leads are put into the lines of important articles to give them greater display.

In the meantime the headlines have gone to the copy cutter's desk, who is one of the chief functionaries of the

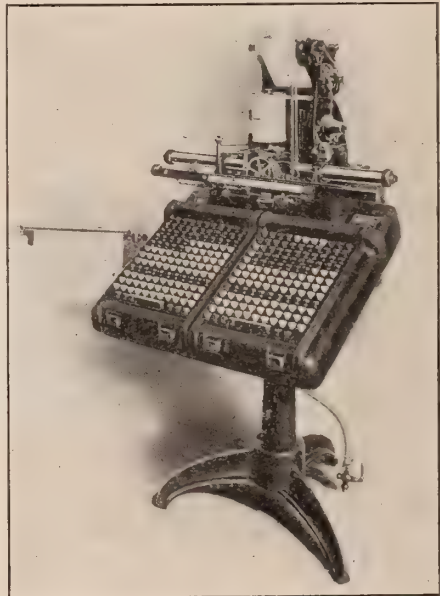


Casting machine of monotype outfit.



The matrix of a linotype machine.

Courtesy of Mergenthaler Linotype Co.



A monotype keyboard. This machine cuts a stencil which is run through a type casting machine, casting separate type.

Courtesy of Monotype Co.



A sample of a monotype stencil.

composing room, and have been sent to the linotype machine that casts lines of heavier type than that used in the type of the article. The larger display lines are still set by hand.

When copy comes into the composing room it is cut up into "takes," and each take, including headlines, are numbered. These numbers are set up by the various machines so that when the proof is finally corrected the whole article fits together, although it may have been set up on ten different machines in widely separated parts of the composing room.

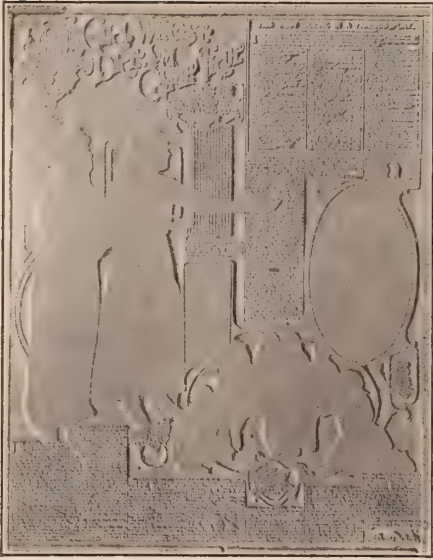
At the make-up table, or "stone room" (although now no stones are used in a modern newspaper office), the editorial departments and the mechanical department come together. The make-up editor, upon whom rests the responsibility of so organizing the various pages that they present the important news in the most attractive and prominent places, supervises the work of the make-up men of the mechanical department.

A SMOOTHLY WORKING CHAOS.

The last fifteen minutes of making-up a modern newspaper, to one who is fortunate enough to be able to get into this "holy of holies," seems to be nothing more than chaos. Men are rushing hither and thither, crowding in and out, shoving galleys of type under each other's arms, grabbing up a handful of slugs here and depositing them there, apparently all in the most aimless confusion. This confusion, however, is merely apparent, because on the stroke of a gong the last line of type goes into the last page, and the forms are locked up and the edition is closed.

The forms are rolled, on iron tables, to the steam table of the stereotyping department. Here they are covered with soft, damp paper and run under rollers at a great pressure. Soft paper is pushed down into the interstices of the type, and the form with its soft paper covering is then pushed over to the steam table proper. This looks not unlike the old book press that always graced the business office of a few years back. A wheel is turned and the press comes down upon the form with its paper blanket, and the whole thing is held there under several hundred pounds' pressure while a tremendous heat is applied from below. This bakes the paper into a stiff cardboard. This is called a "matrix."

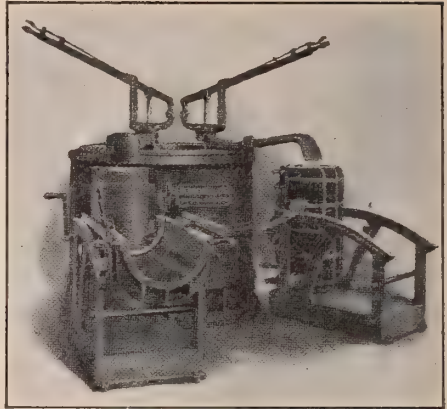
The matrix then goes into the stereotyping room proper. It is put into a semi-cylindrical concave iron bed. A semi-cylindrical convex form is closed down into it, leaving ap-



A newspaper page matrix.

proximately a half inch space between the face of the iron form and the matrix. Into this space is run molten type metal, and after being cooled by a jet of water, the metal comes forth a stereotype plate, curved to fit the press cylinder.

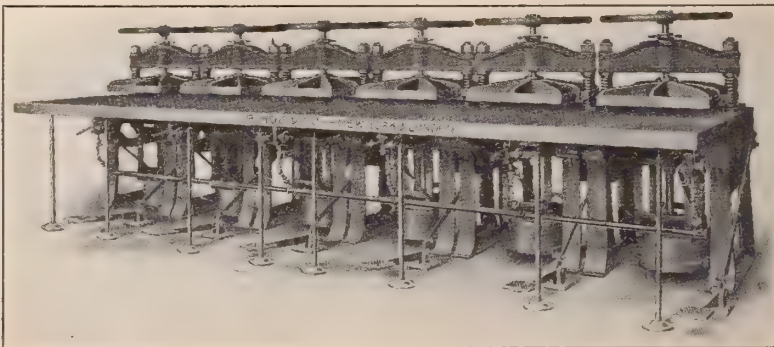
This curved plate is sent through half a dozen processes to trim it and make it exactly fit it to the press



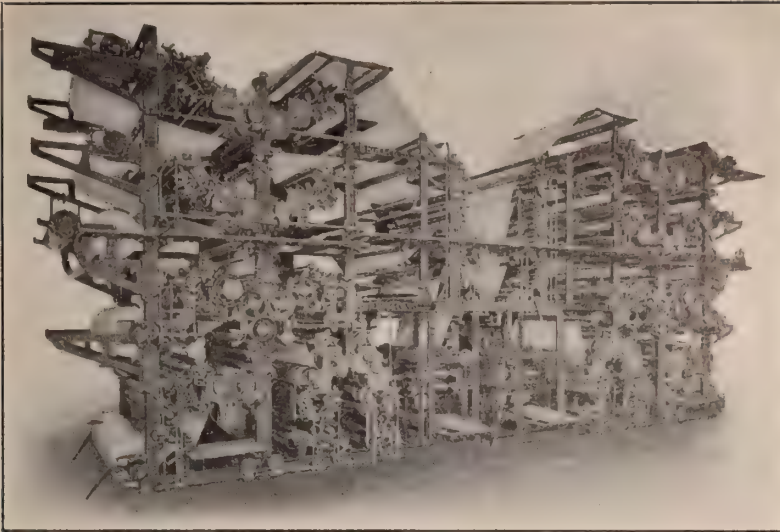
An automatic casting box for the stereotyping plant.

cylinders. When you realize that these cylinders must revolve rapidly enough to print from 75,000 to 300,000 papers per hour, you will realize that everything that goes into such a rapidly moving piece of machinery must be very accurately fitted.

After this trimming is completed, it is sent by elevator or slide to the press room, where the press men speedily clamp it to its proper place among the eight, twelve, twenty-four or thirty-two other pages, and the press is ready to start. This whole operation,



The steam table of the stereotyping outfit where matrices are baked.



A modern eight cylinder newspaper press, with color attachment.
Capacity 144,000, 12-page papers per hour.

Courtesy of R. H. Hoe & Co.

from the time the forms close to the starting of the press, requires less than twenty minutes.

WHAT YOU ASK FOR IN SEEKING FREE SPACE.

When you seek free space in a newspaper, you are asking the editor to place at your disposal this tremendously complicated and highly organized plant. The product of the machine sells for a penny or two, which is not enough to pay for the raw materials that go into its manufacture. Therefore it is that the newspaper must depend for its profit upon the sale of advertising space, and not upon the sale of the paper. The white space of the paper is therefore the only thing of value that the newspaper has to sell. When you obtain the use of that space from the newspaper, you are obtaining a valuable

contribution which should be recognized as such and acknowledged in your annual report.

The best sort of acknowledgment, however, of the many valuable contributions of newspapers, lies in supplying them information that they can use as news, at a time when it is most valuable to them, and, furthermore, at a time when they can use it with the least possible expenditure of effort.

When you realize the tremendous strain under which everyone connected with a newspaper is working during the last hour or two before going to press, so that the forms may be locked up on time, you will realize why it is that you and your publicity material are treated with so scant courtesy if you arrive upon the scene during those last high pressure moments.

Following are some of the most important suggestions which I can make for the guidance of health officers and others, growing out of an experience of some ten years in the newspaper business and eight years in the preparation and circulation of publicity copy:

1. Write on one side of the page only.
2. Leave a good three inches of space at the top of the article for the headline writer.
3. Make news stories as short as possible. If you feel you must be lengthy, submit your article as a "feature" story.
4. Get copy to the city editor of an afternoon paper before 11.00 a. m. and to the city editor of an evening paper before 8.00 p. m. The exceptions to this, of course, are articles of compelling news interest, such as important meetings, dinners, luncheons, and other stories that "break" late in the day or late in the evening.
5. A memorandum of important facts on any situation submitted to the editor-in-chief with a tactful suggestion of editorial comment usually is welcomed by the editorial writer and frequently results in valuable editorial comment.
6. If you have a newspaper man on your staff, have him write headlines on all articles submitted. These should be as nearly as possible the style of headline used by the majority of papers in your territory. Newspaper men will tell you that they prefer to write their own headlines. Nothing in your headline, how-

ever, prevents their doing so. Your headline serves the same purpose with regard to the newspaper men as the newspaper headline serves with regard to the public generally. It brings your story to the attention of the city editor in a very few words, and if nothing else but the headline is read, it serves to focus the attention of the city editor for a moment at least on the important facts of your article. This has a cumulative effect in "educating the press" though I detest the phrase.

7. Always prepare copy and give it to the newspapers at least two or three days in advance when you make an address. This not only saves time for the reporters who are covering the meeting but also prevents misquotation and misinterpretation.
8. Following a conference or convention a short statement of the most important features of the meeting given to the returning delegates to be used by them in interviews with their local papers frequently results in most valuable publicity.
9. Letters to the editor to be printed as such are not the most valuable newspaper publicity but frequently serve to stimulate discussion.
10. Prepare a story on all annual reports or other pamphlets issued by your office. No newspaper man has the time to go through a long report and dig out a story. Few newspaper men are familiar

enough with your work to discover easily the important features of your reports.

11. If tables of vital statistics have no news interest, suppress them so far as newspapers are concerned. The average newspaper reader has no time for a long table, and few newspapers like to print them.
12. Treat all reporters who come to your office alike. Remember, however, that if a reporter comes to you with a question on a story

that he himself has developed, and which he therefore has a right to consider his own "beat" or "scoop," you are in honor bound to respect his confidence, the same as you expect him to respect the confidence you, so many times, must repose in him.

The crowning and most valuable suggestion of all is: employ a newspaper man to do the highly specialized work of newspaper publicity, the same as you would employ a bacteriologist for bacteriological work.

Book Reviews.

American Sewerage Practice. By Leonard Metcalf and Harrison P. Eddy. Vol. III, *Disposal of Sewage*, pp. xiii-851, Illustrated. McGraw-Hill Book Co., New York and London: 1915. May be obtained from the *American Journal of Public Health*, \$6.00 postpaid.

The present volume, dealing with sewage disposal, completes the American Sewerage Practice series, the earlier volumes of which have been reviewed in these columns.

Like its predecessors it contains a wealth of material, well prepared for the use of the practical engineer having in charge the solution of a definite problem.

An introductory chapter dealing with the historical development of sewage disposal and its present status, especially in its administrative and legal phases, is followed by a chapter on chemical analysis, one on the bacteriology of sewage disposal and one on plankton. The treatment of these non-engineering subjects is excellent and may be recommended to health officers and others, whose duties require them to interpret the results of such studies. The attempted description of bacteriological technique in Chapter III is too meager to be of value and might well have been dismissed with a reference to a standard work as was done in the chapter on Chemistry. The growing interest in plankton

studies is well reflected in Chapter IV dealing admirably with that topic.

A chapter on the composition of sewage is followed by one on theories of sewage disposal in which is given a most thorough and practical discussion of all the various kinds of treatment. The chapter on disposal by dilution is also general in nature and comprehensive in scope. There follow successive chapters upon the specific types of disposal addressed more particularly to the engineer.

For the purpose of the present review it is most pertinent to point out that the first 287 pages are by their style of treatment and selection of material adapted to the uses of the health official quite as fully as to those of the engineer. This work should, therefore, go far toward bringing about a better conception of the sewage disposal problem among those who have usually to take the initiative in such matters and whose judgment, often with too little justification, is frequently relied upon for the final decision.

Earle B. Phelps.

A Practical Treatise on Infant Feeding and Allied Topics for Physicians and Students. By Harry Lowenburg, A. M., M. D., Assistant Professor of Pediatrics, Medico-Chirurgical College of Philadelphia; Pediatricist to the Mt. Sinai Hospital, etc. Illustrated with 64 Text Engravings and 30 Original Full-page Plates, 11 in colors. Philadelphia: F. A. Davis Company, Publishers. English Depot; Stanley Phillips, London. 1916. 382 pp. Price, \$3.00 net.

The author, in this work upon infant feeding and allied topics, comes out very strongly in favor of breast-feeding. He shows that far more babies can be fed on the breast than now are, and that the unnecessary cessation of breast-feeding is the cause of many disturbances of digestion and not a few deaths. His directions for the modification of the breast-milk are, however, hardly in accord with our present knowledge of the subject. His general discussion of "percentage" and "caloric" feeding is very satisfactory. In spite of this, however, he makes relatively little use of percentages in his methods of feeding and treatment. He advises the giv-

ing of skimmed milk mixtures in the beginning, gradually working to whole milk mixtures. He advocates the use of cane sugar as a routine measure. He shows his familiarity with the ideas of the German school of pediatricians, but in general follows the so-called American ideas. He differs especially from the German school in recognizing that protein, as well as fat and sugar, may cause disturbances of digestion. He emphasizes very strongly the importance of individualization and experience in the artificial feeding of infants, and in this connection advises the use of the term "adaptation" rather than of that of modification of milk. He constantly

emphasizes the importance of the examination of the stools in regulating the diet both in health and disease, and also recognizes the important part which bacteria play in the etiology of the disturbances of digestion. We regret that he recommends several of the proprietary foods in the treatment of diseased conditions in babies. We believe that it is unnecessary to use these foods, and that the same, or better, results can be obtained in other ways.

After discussing Feeding, he gives chapters on Infantile Atrophy, Rickets, Scurvey, Vomiting, Constipation, Diarrhea, Spasmophilia, The Exudative Diathesis and Pyloric Obstruction. It

seems to us somewhat improper to treat of vomiting, constipation and diarrhea as if they were diseases in the same way as rickets and scurvy. It would seem better to treat them as symptoms of the disturbances of digestion. He believes that spasm of the pylorus is the cause of hypertrophy, and states that clinically all cases of obstruction at the pylorus become operative when sufficient aliment fails to reach the intestines. This seems to us a very reasonable ground to take. The book closes with a chapter on special methods of treatment. There are many pictures, almost all of which are original and very good.

John Lovett Morse, M. D.



The New Public Health. By *Hibbert Winslow Hill, M. D., Director of the Institute of Public Health, London, Canada, and Professor of Public Health, Western University. The MacMillan Co., 206 pp. May be ordered from the Journal of the Outdoor Life, \$1.25 postpaid.*

To write about an apparently dry and technical subject in a fascinating style that grips one's interest and forces one's thought, is no easy task. But to write about old-fashioned, conservative notions on any subject and not to be carried away by the bitterness of criticism to such an extent that constructive suggestion is lacking is far more difficult. Dr. Hibbert W. Hill in his book "The New Public Health" has accomplished both of these difficult tasks. He writes as he would talk, straight from the shoulder, interestingly, breezingly even at times. He writes with all the sarcasm he can muster against entrenched, wrong notions, but at the same time with a sympathetic understanding of the difficulties, and with a wealth of real helpful suggestion. It is a book that anyone, layman, physician, teacher, preacher, or "the man on the street" may read with great profit.

Fundamentally, Doctor Hill's idea of the new public health is a concentration of effort on the segregation, quarantine of the individual infected with a dangerous disease, whether it is typhoid or tuberculosis. The modern health officer (with emphasis on "the modern") does not concern himself so much with garbage, dirt,

bad smells, "poor ventilation" and a score of environmental factors. He concentrates the major part of his efforts on the carrier, the infected case, and the route of the infection itself which he traces from the cases, because here and not from the general environment come the 99 per cent. of other infections. "The sanitary inspection of the modern sanitarium" says Doctor Hill, "so far as it relates to infection, begins and usually ends with the search for (a) the infected individual; (b) the routes of spread of infection from that individual; and (c) the routes of spread of the ordinary excreta from ordinary uninfected individuals to the mouths of their ordinary associates in ordinary life."

The first few chapters of the book are devoted to comparing the old and current ideas about infectious diseases and public health with the new ones. Then Doctor Hill takes up the general principles of the newest public health procedure as applied to individual and community defense against disease. He concludes by illustrating this procedure in the case of such diseases as tuberculosis, diphtheria, scarlet fever, measles, and venereal diseases.

Philip P. Jacobs.

Health Department Reports and Notes.

REPORTS.

Province of Nova Scotia.

The report of Dr. W. H. Hattie, Provincial Health Officer of Nova Scotia, for the year ending September 30, 1914, though late in publication, is well worthy of note. Doctor Hattie has succeeded comparatively recently to Dr. A. P. Reid, the former administrative officer. One of his first acts was to institute considerable publicity work, both to the general public and to all physicians in the Province. To the latter, for instance, were furnished copies of the "Public Health Act," booklets on communicable disease, and leaflets, on the separate diseases, for household distribution. A conference of medical health officers was called with very successful results, more than half of the health officers of the Province being in attendance. The larger part of the report deals with vital statistics, which are discussed illuminatingly, though one might wish that rates as well as absolute figures

were more often given. The predominance of tuberculosis leads the health officer to remark that "our indifference to its ravages is a psychological puzzle." A similar note is struck in the discussion on infant mortality, the figures for which show "very distinctly that conditions which are particularly dreaded"—*e. s.*, scarlet fever—"play in reality a very small part in our infant mortality returns, while other conditions, to which we are placidly indifferent,"—*e. g.* faulty feeding and care—"are robbing us of large numbers of our children annually." These useful appendices embrace a paper on tuberculosis by Dr. S. A. Knopf, one by the Health Officer on tuberculosis in Nova Scotia emphasizing the economic aspect, and a review of tuberculosis legislation in the Province. Altogether, the report gives the impression of being an able and careful survey and interpretation.

Montclair, New Jersey.

The report of the Montclair Board of Health for 1915, under the able health-officership of Mr. C. H. Wells, shows advance even over former good records. The death-rate (9.8 per 1,000) was the lowest, with one exception, of any for the past thirty years, and the deaths of children under five years of age showed a decrease of 24 per cent. over the previous year. All major public health problems being under control, attention is now being directed to those of secondary importance, such as fly suppression, inspection of food stores and tenements, and supervision of ice cream supply. In addition to medical examination of employees in food manufac-

turing establishments, etc., the board now offers private householders the opportunity of having servants examined as a safeguard against tuberculosis and venereal and other disease.

In the anti-fly work, after a long series of experiments, sodium arsenate was adopted as being the most effective as well as the cheapest maggot-killer, and manure was treated so resultfully that breeding was practically eliminated.

The milk-control work for which Montclair has long been famous is fully reported upon. The laboratory diagnosis of venereal disease offered by the Board increased greatly in use.

Brookline, Massachusetts.

This report shows a fine record of public health work accomplished during 1915, with a low resultant death-rate. A good balance is kept between statistical matter and adequate discussion. More attention has been paid to tuberculosis than to infant mortality on account

of the comparative smallness of the latter, and a municipal hospital for tuberculosis was opened early in 1916. Under diphtheria the health officer says that "the serious results would be prevented in many cases if parents would promptly call a physician when their children

have sore throats, and if the physicians would use antitoxin in large doses in all severe clinical cases without waiting to hear the report of the cultures or even when the report of the culture is negative,"—this latter a useful caution against too strict reliance on laboratory diagnosis. A large number of scarlet fever cases among the pupils of a certain school gave rise to popular feeling that the school should be closed, but careful study showed that association outside of the school was largely responsible; the school was kept open and reliance placed on medical inspection in the school. An instance of careful

work was the tracing of three cases of typhoid fever in children to a milk supply: in too many city health departments such a small group infection might be overlooked. Pasteurization of milk is advocated and a municipal pasteurization plant proposed. The discontinuance of terminal formaldehyde fumigation, with the substitution of soap and water and liquid disinfectants on infected surfaces, is recommended: lest citizens misunderstand, this is to be emphasized not as discontinuance of disinfection but as a change of methods.

Pueblo, Colorado.

A creditable report for 1915 is presented by the Chief of the Health Department of Pueblo where the public health is apparently receiving constantly greater attention. One conspicuous result has been the reduction of typhoid fever from a death-rate per 100,000 of 65 (1905-10) to 10 (1915), which is attributed to improvements in the water and milk supplies. Even in 1915 there was a limited outbreak of the disease due to a break in a headgate and the consequent distribution of untreated water. This was so illustrative of the danger involved that steps immediately followed to sterilize the city water supply adequately, the previous treatment not having satisfied the health department. Forty per cent. of the milk supply is pasteurized and

the health officer asserts the importance of general pasteurization as an essential in disease prevention. Milk is rated by an original system in which the total rating for perfection is 100, this figure being made up of 60 points relating to bacteria, 30 to cleanliness, and 5 points each to butter fats and total solids. Those milks which score over 70 are arranged in order of merit for monthly publication. Tuberculosis has declined remarkably from 237 deaths per 100,000 in 1905-10 to 110 in 1915, but no very detailed account of the tuberculosis work is given. The infant mortality rate is not stated, but the health officer advocates infant welfare work. The public health nurse has evidently not yet entered Pueblo, though she may be expected soon.

NOTES.

North Carolina Admitted to Registration Area.

—Dr. W. S. Rankin, secretary and treasurer of the North Carolina State Board of Health, has recently presented his annual report of the work done by his department before the State Medical Society. The excellent work accomplished by the state, through its health department, has been well rewarded by its admission to the Registration Area of the United States. This is the third southern state admitted, the other two states which preceded her being Virginia and Kentucky.

North Carolina is particularly fortunate in being selected by the Federal agencies as the state in which certain health units shall be worked out. As instances, the United States Public Health Service carried through a cam-

paign in Orange County last summer and fall against typhoid fever and soil pollution; the Federal Children's Bureau is working out a unit of infant hygiene work in Cumberland County, and the United States Public Health Service is working out a model plan of county health work in Edgecomb County. This is all being done without expense to the state.

During the year free antityphoid vaccinations were given in twelve counties to 52,000 people, and medical school inspection was done during the winter in three counties, 10,108 children having been examined and 3,250 found defective.

One of the most remarkable demonstrations of health work, cited by the United States Public Health Service, as the best example of scientific sanitation done in the United States, is the

malaria prevention work carried out in the villages of Roanoke Rapids, Rosemary, and Patterson. "Out of a population of about 5,000 there was during the year 1915 not a new case of malaria contracted and not more than a dozen recurrent or 'hang-over' cases, whereas, previous to this anti-malaria work, 75 per cent. of the population had the disease every summer, as many as 200 being sick in bed at one time. Another result, 50 per cent. of the population was coming and going, but since 1914, the year of the anti-malaria work, the transients have settled down and the population increased 500."

Doctor Rankin outlined several new features of health work which the board is now ready to launch, these being, first, a plan for assisting the medical profession of the state in the way of postgraduate medical education; second, a plan of hotel inspection with official grading, to take effect June 1; third, a plan to further health education by means of a moving picture outfit that is prepared especially for rural schools and country exhibitions; and fourth, a plan to establish a nursing service for the whole state by coöperating with the nursing service of the Metropolitan Life Insurance Company.



What Kills the Babies.—According to the *Bulletin* of the Chicago Health Department, in Chicago:

"The diarrheal diseases remain the greatest factor of infant mortality, having caused 36 per cent. of all deaths under two years of age during the past four years. But in 1915 they caused only 2,623 deaths out of the total, 7,564, under two years, or 34.6 per cent. This is the more notable as the total deaths under two years in 1915 were 8 per cent. below the four-year average.

"The impure air diseases accounted for 21 per cent. of the deaths and, next to diarrheal diseases, caused the greatest fatality. These diseases showed a decrease of 17.9 per cent. in 1915, as compared with the four-year average. Acute contagious diseases were 20 per cent. below the average. On the contrary, deaths from congenital defects and accidents were nearly 5 per cent. above the four-year average in 1915.

"Averaging the four years it will be noted that one baby out of every twelve died before reaching the age of two years. Last year it was only one out of 13.6. Let the good work go on until

'being a baby' is taken out of the hazardous occupations."



A Coyote Trapper.—Through the courtesy of the California State Board of Health we reproduce the above photograph of one of the coyote trappers of the board employed in the rabies eradication campaign.



Move to Shift Inspection of New Plumbing to Building Department.—The bill making it possible for the local health boards in New Jersey to transfer the inspection and testing of new plumbing to the building department, whenever any such board decides that plumbing control is not its proper function, is a move in the right direction. The bill was proposed by the New Jersey Health Officers' Association and has been indorsed by the State Department of Health. The latter rightly urges that plumbing has comparatively little relation to public health; that building operations

are hindered and unnecessary annoyance and expense caused by the duplicate filing of plans and duplicate inspections; and that "it is imperative that the energies and resources of local boards of health should be concentrated on those lines of work which have the most direct effect on the saving of lives and prevention of sickness." It might be added that some of the less progressive boards of health think their duties begin and end with plumbing and nuisance inspection and expend their meager appropriations for such work, to the neglect of vital health issues.—*Engineering News*, March 30, 1916.



Notice of a Competitive Examination for Qualification on the Eligible List of Candidates for Positions as State District Health Officers in the Massachusetts State Department of Health.

—Although the law leaves the appointment of district health officers in the hands of the commissioner of health, it is the policy of the State Department of Health to hold competitive examinations for this position and to consider the results of such examinations as the principal basis for selecting appointees.

On May 25 and 26, 1916, and on subsequent dates to be announced at that time, an examination will be held for the purpose of establishing an eligible list of appointments to positions as state district health officers of the Massachusetts State Department of Health.

The written examination will be held on the above dates in the examination room of the Civil Service Commission, No. 15, State House, Boston. The oral and practical examinations will be held on dates and at places announced at the time of the written examination.

There will be at least two appointments to be made from this eligible list in the near future. The eligible list established on the results of this examination will hold for at least one year.

Persons possessing the necessary qualifications and desiring to enter the competitive examination of this service are requested to communicate with the State Commissioner of Health, State House, Boston, at once. Upon such written application, a list of rules and regulations governing the appointment and promotion of district health officers and an application blank will be sent.

Admission to the examination is governed by the regulations accompanying this notice. Physical fitness is a necessary prerequisite, but no percentage credits are given on physique. The examination comprises written, oral and, if feasible, practical tests.

Relative rating on the eligible list is established on the basis of—

(A) Previous experience in public health work, both administrative and scientific; maximum, 20 points.

(B) Results of oral examination; maximum, 20 points.

(C) Results of written examination; maximum, 60 points.

A. J. McLAUGHLIN,
Commissioner of Health.

April 12, 1916.



Measles from a Public Health Point of View.—The New York City Health Department in commenting on measles during the third quarter of 1915 in its *Bulletin* of March 4 offers the following brief résumé of the status of that disease with the health officer:

"The incidence of measles in 1915 up to this period had been very much greater than in the previous year. This year having followed two successive reductions in the number of cases reported it was expected that there would be a large increase in morbidity. However, the epidemic broke out early and soon appeared to spend itself, as during this period there was a very marked reduction in the incidence, 226 cases less than in a similar period in the previous year, but with a much higher mortality, there being 57 more deaths.

"Measles from a public health point of view is a peculiar disease and is but little understood. Recent studies, however, indicate progress, and if the conclusions prove to be dependable, better control may be secured.

"Quoting one observer, 'Measles may be infective as early as five days prior to the appearance of the rash; the appearance of the rash marks probably the height of the infectiousness of the disease; the infectivity does not extend beyond seven days after appearance of rash and is probably much shorter.'

"Experimentally it has been found that a rise in temperature is the first indication of the

disease in the subjects (monkeys) exposed. This rise occurs at least 48 hours before the rash appears. Infectiousness ceases with the approach of convalescence.

"Thus the criticism is most pertinent, that the control of measles is excessive on the one hand and inadequate on the other, the isolation being too long and not established early enough.

"The essential points in regulations for the control of measles are: The case shall be recognized and isolated at the earliest possible moment; the premises upon which the case is isolated shall be placarded; the patient shall be isolated for at least five days after appearance of the rash; adults and children who have previously had the disease need not be restricted but it is advisable to warn them as to the slight possibility of second attacks, and keep them under observation; children who have not previously had measles and who are in contact with the cases need not be restricted for seven days after contact, but should thereafter be isolated for at least ten days and carefully observed. The temperature being taken per rectum—individual thermometers—three times a day. Disinfection after measles is useless and unnecessary. Transmission of measles by a third person or by objects (fomites) is very rare, if it occurs at all.



The Governor's Trophy in Kansas.—The Governor of the State of Kansas is offering a handsome trophy to the county which can show by its record that it is the healthiest county in the state and the best in which to rear children.

To quote the bulletin bearing on this offer:

"There is not a county in Kansas that knows how good nor how bad its conditions are until it has taken stock of itself. To test your county, search out its weaknesses, admit any unpleasant facts about conditions, and set about to remedy them is the only way to prove that your county is the healthiest in the state of Kansas, and to win the prize.

"To prove that one has the healthiest county in the state is more than a matter of pride. There is also a commercial value attached to the winning of the trophy. Better health means increased vigor. Increased vigor means increased production and longer life. They, in turn, mean increased prosperity for the county and every person living in it. Strangers, too, will want

to come to live in the healthiest county in the state, and so increase the population and bring additional wealth.

"The counties that lose this trophy will also win. No effort to improve living conditions is ever unrewarded, and the effort put forth and the results attained will be sheer gain."



Adult Hygiene.—In New York City the Division of Industrial Hygiene is entering the new field of adult hygiene. Among the changing tendencies of recent years of a health department's activities, the most striking is the development of personal hygiene and education, often spoken of as life extension. This branch of preventive medicine, in New York City, had in its first application, the periodic medical examination of the employees of the health department. Now, according to the March 18 bulletin, an extension of this work has been made possible through a special fund which provides for the coöperation of the American Museum of Safety with the Occupational Clinic of the Division of Industrial Hygiene. Hundreds of waiters, cooks, peddlers, bakers, painters, and other industrial groups have been examined at this clinic every month. But, to quote this *Bulletin*:

"The press of work has been so great as to permit little time for medical advisory work on the part of the clinic physicians, and therefore individuals who were found to be suffering from cardiac lesions, hypertension, nephritis, malnutrition, tuberculosis, etc., could but rarely be given advice bearing on the physical defects which were discovered.

"Thanks to the coöperation with the Museum of Safety, the services of a physician have been placed at the disposal of the Occupational Clinic, to carry on this important work. The new plan has been under way for several weeks, and while it is entirely premature to offer any conclusions based on this new phase of preventive medical work, enough has been done to demonstrate that through these means a large number of industrial groups may be aided, to maintain health and prolong life,

"(a) by means of timely medical and hygienic counsel,

"(b) by the distribution of educational booklets and leaflets, and

"(c) by the attempts to secure for them the

aid of private physicians, hospitals or dispensaries.

"A nurse attached to the Occupational Clinic Staff will visit the homes of individuals whose

condition requires further investigation, to offer advice in the hygiene of the home, and to render social service to the family if the social and financial status of the family warrant it."

Public Health Notes.

The Obligation of Municipalities.—In an editorial in the *American Medicine*, March, 1916, attention is drawn to the responsibility of the municipality to provide the opportunity to needy children that remediable defects may be properly treated.

"Much of the advantage of parental education as to the importance of the physical care of their children is sacrificed when it is a practical impossibility for parents to carry out the suggestions and advice given by the department of health. The cost is prohibitive to a large portion of every community. If poor parents are willing to allow their children to be operated on, their lack of resources should not be further complicated by a lack of clinical opportunities.

The main question to be determined is not whether children's clinics shall be established under the department of health or the department of education or under the auspices of private philanthropies, but how quickly can adequate facilities be provided from any source? It is vitally important, not merely from the point of physical development, but from the educational aspects that hypertrophied tonsils and adenoids should be removed as early as possible. In this way children are protected from the serious handicaps which might result from defective speech, increased nervous irritability, possible deafness, educational retardation and even the suspicion of idiocy."

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Epidemic Index of Malaria in the United States.—Surgeon Ezdorf of the United States Public Health Service presents an interesting account of the malarial campaign being carried on in the South in the Public Health Reports for March 31, 1916.

The various methods of determining the malarial index of a place and the technique of examination are described and the following summary of results made:

1. In a total of 13,526 blood examinations,

1,797, or 13.28 per cent. showed parasites of malaria; that is, 1 of every 7.6 persons examined was found to be a carrier.

2. The percentage of infection among the whites was 8.08 per cent., and that among the colored 20.6 per cent.

3. The percentages by color and sex were as follows: white, male, 8.8 per cent.; female, 7.1 per cent.; colored, male, 21 per cent.; female, 20 per cent.

4. The percentage of carriers was highest among those between 1 and 3 years of age, inclusive; lowest between 10 and 14 years.

The extremes of ages of persons found infected were 9 months and 85 years.

5. The tertian type of malaria prevails, the proportion being practically two cases of tertian to one of estivo-autumnal.

6. The quartan type is extremely rare; only two pure quartans and one mixed quartan and tertian were found in a total of 2,391 infections.

7. Mississippi showed the highest percentage of infection, 31.2 per cent., while North Carolina showed the lowest (7.8 per cent.) in these studies.

8. The percentages of infection according to places varied from 1.7 per cent. (Plateau, Ala.) to 40.9 per cent. (for Yazoo Valley, Miss.).

9. In establishing an index in the United States for comparative and economic studies, the examination should include adults as well as children; in other words, a representative index must include all age groups.

10. It is estimated that 1 of 4 infected persons harbors the sexual forms (gametocyte) necessary for infecting a malaria bearing mosquito. This would give an average of 1 person in every 32 (of the 13,526 examined) to be potential malaria carriers at all times.

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Personal Preparedness for Disease Prevention.—"Personal hygiene is the keynote of modern health work," writes Dr. Donald B.

Armstrong in the *Canadian Public Health Journal* for April, 1916.

Doctor Armstrong drives home some very wholesome lessons:

1. Wash your hands before you eat.
2. Insist on your own towel.
3. Insist on your own cup.
4. Screen that sneeze. Remember that coughs fill coffins and there may be a disease in every sneeze.

"These are all practical things we can teach and do. It doesn't cost the city any money nor the health authorities any effort for the average citizen to 'screen his sneeze' and to wash his hands before he eats. It is simply a matter of individual action and personal responsibility without which we as a nation will never be able to take up the next great step in health reform.

"In many communities the public health agents are doing all they can to prevent disease. They have provided a good and safe milk and water supply and thus greatly lowered the milk and water borne diseases, such as typhoid and diarrhoea. The individual citizen could not have protected himself in these ways. However, there is still lots of typhoid—our death-rate still does not approach the ideal death-rate. Public hygiene is but one step in the right direction. Personal hygiene is the next step. It has a double aspect for it is positive and negative; it is creative and suppressive. For a long time we have realized the importance of the health creative aspects of personal hygiene, such as exercise, proper physical activities, sleep, rest, etc. Only recently, however, have we come to the point of realization of the importance of the disease preventive planks in the personal health program."



How Can the Services of the Trained Nurse Be Best Utilized in Public Health Administration?—Dr. Charles J. Hastings draws attention to this very important phase of Public Health work in the April number of the *Public Health Nurse Quarterly*.

"It is somewhat surprising that administrators of public health have so long failed to recognize the value of, and opportunity for women's work in this world-wide campaign—and yet we have not altogether been without men with vision in this respect.

"The efficient education of all of our mothers in the principles of child hygiene, sanitary science, domestic science, domestic economy and in home-making, is the key to our future national greatness. This is essentially women's work."

Doctor Hastings then goes on to show the great range of activities in which the public health nurse can play an all important part and discusses the various organizations which are carrying on work along these lines. His conclusion is that:

"Whatever system be adopted, of paramount importance is the personnel of the organization. Too much care cannot be exercised in the selection of nurses, especially as regards natural qualifications. The public health nurse should be a born diplomat. She should have more than average ability, character, tact, education and energy. She must be resourceful and, where discouragements present themselves, persistent. At all times prepared to meet difficulties, and probably the most valuable asset is that of a sense of deep human sympathy, such as will inspire confidence, as the personal touch with the numerous individuals that they will have to come in contact with means so much. Firmness combined with tenderness; such—women of course are born, not made.

Secondly, she must be a good general nurse, otherwise she will not be a good public health nurse. The qualities which make her an efficient nurse will in most instances make her an efficient public health nurse, and inasmuch as she will require to do social service work, and in fact meet all the requirements for home making and home rehabilitating, the experience which the trained nurse has had through her familiarity with the sick; the discipline of regular hospital work; the eye trained to observe; the hand and mind to act quickly and skillfully, will be valuable assets to her."



Health Centres as an Aid to Democracy.—"Health centre experiments in half a dozen cities are the latest manifestation of the district idea in social work, which has distinguished the settlement movement, district relief, district nursing associations, etc.," according to the *Survey* of April 22, 1916.

"The National Social Unit Organization, which was launched last week in New York, is

a large scale experiment of this sort. The district problem is, of course, on the one hand to bring to bear in a given neighborhood the whole philanthropic sanitary and civil resources of a city; and, on the other hand, to create a focal point through which the initiative and social interest of the dwellers round about can express itself."

The promoters of the National Social Unit Organization believe "that such a centre could gather complete and current social statistics—on infant mortality for example—more quickly, dependably and serviceably than any bureau of health; and that, by organizing service groups (such as doctors of the neighborhood who take maternity cases), professional standards could be raised and a new and more democratic organization of the national and social forces in the community would result."



Legislation by Hit and Miss.—Under the above title the *Survey* for April 29 summarizes the treatment accorded to bills by the New York legislature during the last hours of its session. To quote this weekly:

"Transfer of the quarantine station at the port of New York to the Federal government and confirmation of Governor Whitman's nomination of Dr. L. E. Cofer of the United States Public Service as health officer of the port was accomplished at the twenty-third hour of the last legislative day in New York. Not only for its intrinsic importance, especially at this time when Asiatic plagues are creeping westward and the close of the war is to have unpredictable effects upon immigration, but in contrast to a generally barren session, this placing of a trained quarantine man at our chief port of entry stands out as an important gain.

"The other chief health measure—the appointment of a commission on health insurance—went by the board, so that unless Massachusetts acts or Congress is galvanized into passing the federal bill, the pioneer California commission will have to go it alone for this year at least.

"And the governor must pass, too, on the fruits of the annual legislative raid of the New York cannery. Both Assembly and Senate passed the Spring-Brennan bill, a reincarnation of the notorious Thompson bills defeated by last year's legislature.

"Under the present labor law the cannery men are favored above other manufacturers by being allowed, under certain conditions, to employ women sixty-six hours a week and eleven hours a day during the rush period from June 15 to October 15. The Spring-Brennan bill would give the State Industrial Commission power to extend even these hours, so that women of eighteen years and upward may be employed for a limited number of days twelve hours a day. It also fixes the closing hour as 12 p. m. instead of 10 p. m. and makes Sunday work possible. Thus eighteen hours may be added to the week of girl cannery workers if the Industrial Board 'shall find such employment is required by the needs of such industry in emergencies and can be permitted without serious injury to the health of women so employed, and wages of one and a half times the usual rate are paid for all overtime in excess of ten hours per day.'

"The wage clause is regarded as a sop to 'uplifters.' It is doubted, however, whether the Industrial Commission, even if it could enforce such a provision, has the lawful power to fix wages for either overtime or ordinary time."



The Boston Dispensary.—The report of the one hundred and nineteenth year of this splendid institution has recently appeared. Progress has been made in many directions during the year. The X-ray department has been improved, the laboratory enlarged, special classes for certain long time cases of disease formed, the follow-up system greatly extended, night clinics for those who cannot come in the day time continued and the Children's Preventive Clinic established.

"What services are we aiming to render?" asks the director, Michael M. Davis, Jr., and the answer:

"To relieve suffering, to cure illness, to prevent disease, to grapple with the economic or social conditions underlying bodily sickness or distress, to promote the health of the community by the hygienic education of at least some of its members—these are among the obvious answers. Concretely, our foremost task is to provide medical diagnosis, advice, and treatment. Thereunto we supply medicine, nursing service, bandages, braces, splints, crutches; perform operations. We give social service;

arrange for hospital care or vacation; for relief from poverty; for a change of occupation; we give corrective gymnastics to round-shouldered children, and determine internal mysteries of disease with the mysterious X-ray."

How well the dispensary has met these aims is shown in the reports of the various departments.

The medical staff reports the installation of a complete X-ray machine, fluroscope, operating table and accessories. New equipment for the developing room, a large illuminator, ample plate racks, etc., have been added, and the whole installed in fresh commodious quarters. In the laboratory Wassermann tests are carried on and facilities lately introduced for doing complement fixation tests for gonorrhœa.

The three evening clinics have established themselves as interesting and valuable features of the dispensary. The Evening Genito-urinary Clinic has become a large service, equal in size to the morning clinic, the average attendance on each of three evenings a week being sixty patients. The Syphilis Clinic has increased to an average of nearly twenty-five a night, and the Evening Eye Clinic, the earliest established, is now ending its third year with an attendance of between twenty and twenty-five on two nights a week.

In March, 1915, a new step was taken in the children's department under the name of Preventive Clinic. The benefits to be expected from a centralized and continuous medical record of a child who is in charge of a charitable society are obvious. The system is of great practical value in disclosing defects, determining general physical condition, learning of conditions detrimental to health and deciding upon the course to be followed in the care of each child, basing all decisions upon a broad knowledge of the medical situation. As an example of conditions exposed in this clinic we may note that, in the nine months in which the clinic was in operation, 119 children have been examined, of whom 111 have shown defects, 74 of these showing more than one defect.

The Social Service Department records splendid results from the follow-up system of handling cases, and offers some striking figures showing the reduction of "wasted work" (persons who fail to return for treatment) from 45 per cent. to 6 per cent.

The registrar reports an investigation of the financial and social standing of its patients and its efforts to supply medical aid to those unable to pay for adequate treatment.

Fully three fourths of all our patients belong to family groups, and more than three fourths of these families have but one wage-earner. Thirty-seven per cent. of families live on \$600 or less, 49 per cent. on \$700 or less, 70 per cent. on \$800 or less, 77 per cent. on \$900 or less, 83 per cent. on \$1,000 or less per annum; 3 per cent. are dependent on charitable relief; 14 per cent. have over \$1,000, *i. e.* not more than 1,400 new families a year have more than \$1,000, while 8,000 to 9,000 have less than \$1,000. Among those listed as unmarried, about 4,000 new patients a year, 78.6 per cent., are living on \$600 or less a year, *i. e.* only between 700 to 800 unmarried applicants out of 4,000 earn over \$12 a week.

It is a general opinion among students of wage-earners' budgets that even small families in this vicinity living on \$1,000 or less a year should not be expected to purchase more medical service than that necessary to child-birth and acute illness in the home. As the use of our free district physicians shows, many families cannot meet even these emergencies. We have seldom, therefore, doubted eligibility or refused treatment at this dispensary, unless the family income exceeded \$1,000. Our rule for the unmarried wage-earner is to weigh carefully the reason for accepting when the income passes \$600.

The conclusion from this, then, is that there is a great section of the population which must have treatment at rates that can only be made in large public or endowed institutions.



Fertilizers from Municipal Waste.—A survey of the nation's resources in fertilizer materials has drawn attention to the large supply of these to be found in the accumulation of garbage in cities. This waste material contains nitrogen, phosphoric acid, and potash, which are recognized as essential to the production of large crops. Valuable as these elements are to the farms of the country, the garbage in which they are found is a source of trouble and expense to the cities. It seems, therefore, that this garbage can be disposed of most advantageously by returning it to the soil in the form of fertilizer.

In cities of 100,000 people or more, the reduc-

tion of garbage by methods which furnish a residue fit for fertilizer use has proved to be a profitable municipal enterprise, and in smaller communities it might well be self-sustaining. Numerous analyses of raw garbage show that, on the average, grease constitutes 3.5 per cent. and of the fertilizer ingredients, potash, 0.3 per cent., bone phosphate, 1 per cent., and nitrogen in the form of ammonia, 1 per cent. On this basis the value of a ton of raw garbage is about five dollars, the grease being worth three dollars and the fertilizer ingredients about two dollars.

Since the grease is of more value than the fertilizer, the reduction process is primarily designed to recover the grease. There are three principal methods of doing this. The garbage is cooked and steamed and then pressed dry and degreased in gasoline. Or, the garbage is dried directly in rotary hot air kilns and then degreased in gasoline; or it is dried and degreased in one operation.

As raw garbage contains 70 per cent. water and 3.5 per cent. grease, the yield of the tankage residue or fertilizer should be about 25 per cent. Thus, four tons of raw garbage should be made to yield one ton of dried tankage and \$12 worth of grease. In the retail market the dried tankage sells for about \$10 a ton and at wholesale for \$7.50. There has been no great fluctuation in these prices for some time. In actual practice, however, the percentage of tankage obtained is not usually 25 per cent.

At present, however, only six cities in the United States operate their own reduction plants, and about twenty send their garbage to privately owned plants. These produce in the course of a year 160,000 tons of tankage, or fertilizer, made from 1,045,000 tons of raw garbage. If all of the 199 cities in the United States which have a population of 30,000 or over should adopt this method of garbage disposal, the total yield should be from 637,500 tons to 937,500 tons of fertilizer per year. This would be worth from

\$4,780,000 to \$7,000,000. Additional fertilizer material could also be obtained in the cities from dead animals, street sweepings, and stable manure.

This subject, specialists in the U. S. Department of Agriculture believe, merits careful consideration, because it will be of advantage both to the American farmer and to the cities from which he obtains his fertilizer.



The Industrial Nurses Club which was organized in October 1915 and which holds its monthly meetings at 3 Joy Street, Boston, adopted its Constitution and By-Laws at the recent meeting March 14, 1916, Miss Nathalie Rudd, President (of the Plimpton Press, Norwood), presiding.

The objects of the club are set forth as follows:

To discuss problems relating to the health and well being of workers in industry, particularly those problems of hygiene, sanitation, etc., which come within the province of the nurse.

To develop, through discussion, an efficient and practical standard for the nurse in industry, including

The personal and professional qualifications of the nurse.

The methods of furthering "prevention" of illness.

To stimulate, through the work of the club, not only the enthusiasm of its members, but the interest of the general public and particularly of employers to a fuller understanding of the value of the work of the nurse in industry.

Any nurse, who is a graduate in good standing of a recognized training school, and who is engaged by a corporation or by an individual in the interest of his employees, is eligible for membership, and will receive on request an Application for Membership Form by communicating with Miss B. Magee, Secretary-Treasurer., 215 First Street, East Cambridge, Mass.

Industrial Hygiene and Sanitation.

Safety through Window Cleaning.—Pursuant to the established policy of the Industrial Accident Commission of California, a committee has been appointed to investigate the hazards of window-cleaning. This committee, after an investigation, will report to the commission, submitting tentative safety orders.

Public hearings on the proposed rules will be held by the commission before their final adoption.

The committee will be composed of employers, employees and experts.



Health Insurance in New York.—The first important legislative step toward social and health insurance in this state was taken when the Senate passed the bill creating a commission of two senators, two assemblymen, and five persons not in the legislature to report on the subject next year.

This bill, which appropriates \$25,000, must also pass the assembly to be effective.



Standards for Safety.—The Rating and Inspection Bureau which has been formed under the supervision of the Massachusetts Insurance Department, has established certain standards for safeguarding plants. Each employer will be charged an individual rate, based upon the particular safety conditions existing in his own plant and upon his accident record. If his plant is better than the average in these respects his rate will be reduced accordingly; if the conditions are inferior to the average a higher rate will result.

Thus the employer who has done his utmost to reduce accident hazards will be relieved from the burden imposed by the careless or indifferent employer, and the latter will be correspondingly penalized.



The Influence of the Factory on the Workman.—Dr. E. R. Hayhurst, in a discussion before the American Public Health Association, believes that, especially with our foreigners, the place to promote social delinquencies is right at

the work place and believes that the manufacturer should set a good example.

Doctor Hayhurst states: "If those men are set examples of unsanitary conditions and faulty hygiene for ten or twelve hours of the day that they are awake at their work places, how can you expect them to do any better at their homes or in their habits?"



Wash and Change Houses for Miners.—We often hear it said that whenever sanitary facilities, such as shower baths and other equipment are furnished for the use of workmen, difficulty has been experienced in getting the workmen to fall in line with these innovations and to make proper use of them.

Dr. Joseph H. White, in a paper issued by the United States Bureau of Mines, gives the following enlightening information on this subject:

"Information that has been obtained concerning several thousand miners who were provided with wash and change house facilities shows that an average of about 85 per cent. of the total number on pay-roll used the wash and change houses daily. In a large number of the cases reported there was a fee, varying from fifty cents to one dollar per month, for the use of the wash and change house. One company making a charge of fifty cents per month for the use of the lockers and the bath privileges claims that the charge causes the men to make better use of the facilities provided. At the outset there will be some one who will not use it, as miners, particularly the older ones, take slowly to innovations.

"Some of the earlier wash and change houses were not kept clean or properly maintained, and so fell into disfavor. Their equipment was such as to breed and spread vermin. Warm water was not always available, and fixtures were often out of repair or so inadequate that much time would be wasted in taking a bath.

"Facilities at the wash and change house should be such as to cause the miner no more delay than is necessary. There is necessarily going to be some additional time used.

"Charges have also been made that the wash

and change houses have been abused and subjected to all kinds of vandalism by the users. Such reports are said to have discouraged some companies who have introduced the houses from extending them to their other operations. This condition is unfortunate, and, as with many other privileges, the misdeeds of a few cause numerous innocent ones to suffer. An attendant should always be in charge of a wash and change house, so that the acts of vandalism of a few—perhaps four or five out of a hundred—cannot discredit the large number that appreciate and are benefited by this worthy improvement."

This statement refers especially to miners. There is reason to believe that some of the reasons given for the lack of full success of sanitary installation may be applicable to factories in general.



Accidents in Massachusetts.—An interesting report on the number of accidents to workmen in employment has been given out by the Massachusetts Industrial Accident Board. It is interesting especially because it opens up a field for speculation as to the way this important piece of social legislation is working out in practice.

It appears that for the nine months from April, 1915, to March, 1916, there has been an increase over the corresponding period of nine months ending March 31, 1915, of 42 per cent. in the total number of reported accidents. While the number for the same period last year was 70,125, it is 99,662 this year, an increase of 29,537.



Suction Shuttle Law Unchanged.—The bill before the Massachusetts legislature, which would have exempted woolen mills from the Suction Shuttle Law, which forbids use of shuttles which "may be sucked," has failed of passage in the House of Representatives.

The House refused to attach enough importance to the bill to dignify it with a postponement and killed it without further ado.



War within Our Own Border.—Mr. Arthur Williams, president of the American Museum of Safety, gives some striking comparisons based on statistics compiled by the museum and which

show the number of workmen killed or injured annually in American industries:

"The United States," says Mr. Williams, "is continually waging a bloody war within its own borders—a war in which the casualties amount to 35,000 lives each year and in which the total number of wounded annually is 1,590,900. It sounds more like the returns from the battlefields of Europe, but in reality it is the number of workers killed and injured every year in our American industries. It is appalling when we stop to consider 35,000 wiped out every year in times of peace. This would constitute an entire division of the army or in other words the whole National Guard of New York State, with every unit recruited to war strength. In two years it would more than equal all of the union soldiers killed in battle during the Civil War, which was 67,066.

"We have actual proof at the museum of where accidents and fatalities have been reduced 50 per cent. and in many instances much more than 50 per cent. in a single year in the most hazardous industries. The museum is now planning the Third National Safety Exposition, which will take place in New York, May 22-27.



Health Insurance and Congress.—Congressman Meyer London's bill to create a commission on unemployment and social insurance received two hearings in April before the Committee on Labor of the United States House of Representatives, which brought that subject forward as a national issue for the first time. Extended hearings were necessary in both instances and great interest was manifested by the committee through their questions.

But few persons appeared in opposition, while in favor of the bill there appeared a large number of persons who were interested in social economics.

Evidence of the growth of the social insurance movement was presented by Rufus M. Potts, who is responsible for the creation of a social insurance committee by the National Convention of Insurance Commissioners. Mr. Potts is chairman of that committee. It has prepared a report on the entire problem in the United States, which he was permitted to print as an appendix to the hearings. Apparently the bill has a good chance of being reported to the House.

Legal Decisions.

Impure Water—Company Enjoined from Collecting from Consumer. *City of New Castle v. New Castle Water Co.*; 95 *Atlantic Reporter* 534 (Penna.).—In this case the New Castle Water Company was restrained by the lower court from collecting its regular water rates for a certain period of one and one-half months during which the water it had furnished was unfit for domestic use. It appeared that the water contained sufficient quantities of *B. coli* during this period to make it dangerous to health. It was also brought out that both the state law and the contract of the company, as expressed in its charter, compelled it to furnish pure and safe water. The supreme court of the state (Penna.) therefore sustained the injunction. The opinion by Justice Brown, the Court says, "The decree is confined to domestic consumers and users of water for the period of one month and a half. It is as mild as the undisputed facts could have justified."

✱

Nuisance Special Order—Penalty Must be Fixed when Order in Mode: *Village of Carthage v. Colligon*, 110 N. E. 439 (New York).—Local boards of health are authorized by law in New York state to make special orders for the suppression of nuisances. In this case an order was made and notice served. He disobeyed the order and a penalty was fixed then. The court held that no penalty could be defined after the offense had been committed; the board could abate the nuisance or enjoin its continuance. But a penalty for a special offense already past was like a penalty for the violation of a general ordinance and could not be imposed later.

In many states this action would be expressed contrary to constitutional provision prohibiting any sort of retrospective legislation. The court does not say whether it rests its determination upon any such fundamental provision or merely upon the general principles of statutory interpretation.

✱

Civil Service—Error in Appointment of Health Officer—Error in Civil Service Certification—Appointment of Health Officer Upheld: *McLaughlin v. Green*, 152 *Pacific* 661 (Kan.).—The civil service certified a name as second highest on a list through error. He was appointed and upon

discovery of the error he was removed from office. The health officer brought a writ of mandamus to compel the appointing authorities to revoke the order for his removal. The district court held that he was legally appointed, having been certified by the civil service commission, and was entitled to the benefit of a statutory provision under which he could be removed only for misconduct or neglect of duty. The Supreme Court held that the civil service commission was bound by its certification and he could not be removed by the board appointing him. It was incidentally necessary for the court to find that the position of health officer of Kansas City, Kan., was a public office of the sort subject to the Civil Service law and, therefore, entitling the incumbent to the rights which McLaughlin here relied upon.

This case apparently indicates that a mistake in certifying a civil service list is a thing past repair when once an appointment has been made. It should be noted, however, that the Supreme Court here says: "A court, unless it be in proceedings in *quo warranto*, cannot inquire into the validity of that appointment." It is, therefore, intimated that in *quo warranto*, which is always the correct procedure for trying title to office, another aspect of the case might have been brought out.

Without the knowledge that the health officer would make this fight to retain his position the board used the most expedient means of ousting him when it attempted to do so arbitrarily. On the other hand it would have been more to the advantage of the health authorities to have entered a bill for *quo warranto* in reply to his mandamus, then to defend and carry that action to the Supreme Court.

✱

Heart Weakness—Aggravated by Employment—Ground of Recovery under Massachusetts Workmen's Compensation Act: *Modden v. American Mutual Liability Insurance Company*, *Supreme Judicial Court of Massachusetts*; *Department Reports for Feb. 12, 1916*.—Honora Modden was employed by a subscriber under the Massachusetts Workmen Compensation Act. Her work involved pulling heavy rolls of carpet over a table. The Compensation Commission found that she had a weak heart condition prior to entering this employment. The recovery was allowed upon a showing that due to the nature of her work in pulling the heavy rolls of carpet across the table she suffered a further acute im-

pairment of the strength of heart so that it was disabled from performing its normal functions as it had before. The commission found that this was a damage to a physical organ and the Supreme Court sustained this finding.

The insurers argued that the harm was not wholly the effect of her work but was due partly to the previous weakened condition of her heart. The court emphasized the fact that the purpose of the act was to protect the employee and held the commission was justified in finding that the occurrence described by the employee when she said she "felt something give" and "felt something else give way," was a personal injury. In denying the contention that the employee's previous weakened condition was a bar to recovery, Justice Rugg said:

"It is the injury arising out of the employment and not out of disease of the employee for which compensation is to be made. Yet it is the hazard of the employment acting upon the particular

employee in his condition of health and not what that hazard would be if acting upon a healthy employee or upon the average employee. The act makes no distinction between wise or foolish, skilled or inexperienced, healthy or diseased employees."

and again:

"The reasons which have been set forth in this opinion and in the cases to which reference has been made seem to us to compel the conclusion that on the evidence here disclosed it was competent for the industrial accident board to find that the employee had received a personal injury in the course of and arising out of her 'employment,' according to the true meaning of those words in the workmen's compensation act."

This able opinion by one of the ablest judges of the country has given to the Workmen's Compensation Act a broad humanitarian interpretation which should make it of greatly increased significance in industrial health questions.

Personal Notes.

Dr. E. F. McCampbell has resigned from the position of secretary of the Ohio State Board of Health to accept a position with the medical department of the Ohio State University, devoting himself particularly to preventive medicine and sanitary science.



Dr. Wilbur A. Sawyer has been appointed clinical professor of preventive medicine and hygiene in the University of California. He will continue also his work as secretary and executive officer of the California State Board of Health.



Dr. Paul S. Hill of Biddeford, Me., has lately been appointed a member of State Board of Health of Maine.



Dr. John W. McShane of Kenosha, Wis., has been appointed city health officer of Akron, Ohio, succeeding Dr. Albert A. Kohler.



Dr. C. E. Ford has accepted a post with the General Chemical Company of New York City, in the capacity of medical director, having to do with the development of a department of social medicine.

Dr. Theodore B. Sachs, head of the Chicago Municipal Tuberculosis Sanatorium, on April 2 committed suicide. His tragic death is attributed to be the sequel of the bitter political fight which has been waged against him.



The following persons were elected to membership in the American Public Health Association:

Robert Stanley Quinby, M. D., Watertown, Mass., Director, Welfare Work, Hood Rubber Co.

J. M. O'Maley, Covington, Ky., Physician.

Christine R. Holmes, Cincinnati, Ohio, Physician and Surgeon.

Agnes Morris, New Orleans, La., Instructor, State Board of Health.

Fred E. Hamlin, Staunton, Va., Physician and Health Officer.

Richard T. Fox, Chicago, Ill., Sanitary Engineer.

Norman E. Brundage, Delphos, Ohio, Physician and Health Officer.

Albert Hartwell Jewell, Ann Harbor, Mich., Sanitary Engineer.

Sidney J. Rauh, Cincinnati, Ohio, Dentist, Chm. Oral Hygiene Com., Ohio State Dental Society.

Willard Converse Mallalieu, Jersey City, N. J., Civil and Sanitary Engineer, in charge Sewage Disposal Work of Jersey City.

Lawrence W. Hollis, M. D., Member Texas State Board of Health, Abilene, Tex.

Rushmore Sape, Physician and Surgeon, Fair Haven, Vt.

Hiram L. Manchester, Pawlet, Vt., Local Health Officer, Physician.

James S. Hill, Bellows Falls, Vt., Physician, Health Officer.

Caius T. Ryland, 1022 Main, Lexington, Mo.

George H. Noxon, M. D., Darien, Conn., Physician and Surgeon.

Paul Sorkness, M. D., Fargo, N. D., Physician and Health Officer.

Douglas S. Graham, Dallas, Tex., Chemist and Bacteriologist.

J. S. Schmidlapp, Cincinnati, Ohio.

Jacob D. Gilleyen, M. D., Jackson, Miss., Physician.

William W. Hickman, M. D., Noxopater, Miss., County Health Officer.

Harvey T. Cuming, M. D., Gloster, Miss., Physician.

Ephraim R. McLean, M. D., Cleveland, Miss., County Health Officer.

John C. McNair, M. D., Fayette, Miss., Physician.

Henry Boswell, M. D., Booneville, Miss., Health Officer.

Bern D. Colby, M. D., Sudbury, Vt., Physician and Health Officer.

Clarence N. Boynton, M. A., Phoenix, Ariz., Chemist and Bacteriologist.

Otto P. Geier, M. D., Cincinnati, Ohio, Director Employees Service Dept., Cin. Milling Machine Co.

Charles F. Congdon, M. D., Mystic, Conn., Health Officer.

Thomas J. Kilmarten, M. D., Waterbury, Conn., City Health Officer.

George Smith, Manchester, Vt., Health Officer.

Howard L. Hull, M. D., Harrisburg, Pa., Associate Chief Medical Inspector.

Edward A. McLellan, M. D., Bridgeport, Conn., Physician and Health Officer.

George E. Lemmer, M. D., Danbury, Conn., Health Officer and Physician.

George Fhabault, M. D., Physician, Winooski, Vt.

Salmon G. Howd, M. D., Winsted, Conn., Physician.

Arthur C. Norton, M. D., Middletown Springs, Vt., Health Officer and Physician.

Isaac M. Rubenow, Ph. D., New York City, Statistician and Actuary.

George E. Ober, M. D., Bridgeport, Conn., City Bacteriologist and Physician.

Forest J. Funk, Port Limon, Costa Rica, United Fruit Co., Research Laboratory.

Morris J. Alexander, M. D., Tunica, Miss., County Health Officer.

Victor James Capron, M. D., Seattle, Wash., Epidemiologist, State Board of Health.

Thomas R. Wilber, Seattle, Wash., Bureau of Vital Statistics, State Board of Health.

John S. McBride, M. D., Seattle, Wash., Commissioner of Health, Seattle.

Frank Perry, M. D., Norwood, Ohio, City Health Officer.

Rev. J. O. White, Cincinnati, Ohio, Director of Department of Charities and Correction.

David N. Roberg, M. D., D. T. M., Portland, Ore., State Health Officer and Registrar of Vital Statistics.

H. Edmond Wiedemann, St. Louis, Mo., Consulting Chemist and State Chemist, Food and Drug Department of Missouri.

M. A. Bantrell, C. E., Rochester, N. Y., Engineer and Chemist in charge Brighton Sewage Disposal Plant.

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American Journal of the Diseases of Children, Chicago.*II. April.*

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Bacillus Coli Cystitis and Its Successful Treatment. J. Favil Biehn.
 Vaccine and Serum Therapy in Everyday Practice. W. C. Wolverton.

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A Case of Mycetoma in Hawaii; Its Etiology. M. T. Clegg and W. C. Hobdy.
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Industrial Medical Supervision. Arthur B. Emmons.
 The Truth About Smallpox and Vaccination. George W. Gay.

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Pellagra, a Review of the Subject. Charles A. Howland.

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Alcohol in Relation to Mental Disease. A. J. Rosanoff.

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Medical Times, New York.*XLIV. April.*

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 Medical Legislation in the United States. Charles A. Boston.

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 Sanitary Conditions in Rural Schools. Thomas J. McNally.

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 How Can the Services of the Trained Nurse be Best Utilized in Public Health Administration? Charles J. Hastings.
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The Conservation of Health. John W. Duke.
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SANITARY DISTRICTS IN THE ANALYSIS OF MUNICIPAL MORTALITY AND MORBIDITY DATA.

PROF. ROBERT E. CHADDOCK,
Columbia University.

Read before the Vital Statistics Section of the American Public Health Association, Rochester, N. Y.,
September 10, 1915.


PART I. THE ARGUMENT FOR SANITARY DISTRICTS.

THE object of the health movement, stated in briefest phrase, is to lengthen and strengthen human life. To clear the way for effective action, the factors which cut short or weaken the lives of men, women or children must be carefully analyzed and must be clearly understood. If the urban environment, the industrial changes, the coming of various foreign peoples bring new dangers to health and safety, these should become the objects of investigation.

Health and safety have not been fundamental considerations in locating or building our cities. Bad housing, dangerous working conditions, inadequate sanitation, have cost thousands of lives each year, but the flow of population has not been turned back from the city. It is the function of the health movement to make the modern city more than a labor market and a place of business—a healthy and comfortable place in which to live as well as to work. To

accomplish this aim, more exact data should be recorded concerning the effects of the urban environment in its various aspects. Every addition to our knowledge reveals the lack of proper adjustment, the existence of selfish exploitation and the absence of coöperation for the common welfare.

THE CITY A HEALTH LABORATORY.

There is a sense in which the city may serve as a health laboratory. It is impossible to control people and environment as the natural scientist controls the substances with which he experiments in his laboratory. Nevertheless, it is possible to investigate the variety of conditions that affect health and safety, to modify or control the factors which seem responsible for bad results and to observe the effects of these changes upon the mortality and sickness of the community. 

The health movement involves scientific investigation and experiment in a broader sense than standard tests

in laboratories for milk and water or for the detection of disease. Before the health official is spread the great variety of factors which, in the modern city, affect, in varying degree, the welfare of the people. Many nationalities live under different conditions of housing and sanitation. Various occupations show different degrees of risk to health and safety. Housing and sanitary conditions vary from the worst to the best. Records of death, sickness and injury furnish the health department with an excellent measure of the varying influence of these different factors. Records of the physical examination of school children furnish evidence for or against the environmental and hereditary influences to which they have been subjected.

WORK OF HEALTH OFFICIALS SHOULD BE GUIDED BY VITAL STATISTICS.

The health departments of our American cities have scarcely begun to utilize their vital statistics. Therefore, it is not strange that the unit of area covered in the analysis of these records has not received adequate consideration. It is recognized in sanitary science that vital statistics, properly analyzed, furnish the guide to the discovery of bad conditions and their causes. Again, the success or failure of a remedy devised by the sanitarian is tested by a new record of the facts.

It is for the more effective use of vital statistics in assisting health practice and administration that this paper pleads. The health budget of our large cities involves the expenditure of millions of dollars each year. There-

fore, in the interest of maximum results in lives saved and strengthened, it is important that the health officials possess exact knowledge of mortality and morbidity in every part of their field of activity. Effort and expenditure may then be directed to the places where the need is greatest, and where the largest results are likely to be achieved.

No effort will be made in this paper to emphasize the short-comings of municipal vital statistics in the United States in reference to the details of the analysis, by age grouping, race, occupation, cause of death, etc. These detailed criticisms and comparisons with foreign practice are carefully presented in a paper, familiar to you, by Dr. Frederick L. Hoffman, before the 15th International Congress on Hygiene and Demography, at Washington, in 1912 (Transactions, Vol. 6, pp. 113-130). The situation is not essentially different at the present time. *The area of analysis is our chief concern in the present discussion. In most American cities it is too inclusive. Vital facts are tabulated and summarized by political or administrative divisions, the borough, ward or assembly district. Crude death-rates are presented for an entire borough or at best by separate wards. Sickness data are rarely analyzed at all. The area of analysis includes, in most cases, conditions that are too dissimilar. Both good and bad housing and sanitary conditions are found within the given area. Different occupations are carried on in different parts of the district and several nationalities make up the aggregate*

population. In one part of the area health conditions may be very good, in another part the conditions may be very bad. To calculate a mortality or morbidity rate per 1,000 of the entire population of the ward or borough shows nothing that is true. *It represents neither good nor bad health conditions accurately. It conceals the worst conditions through the inclusion of the best and thus deceives, at least the public.* Such a rate is of no value for practical use by the sanitary authorities. The wide variations in mortality, in different parts of such an area, *i. e.*, a ward of New York City, will be given in detail later in this paper. A policy of efficiency demands accurate information which will not conceal the true health situation in any part of the city. The facts are needed to arouse public opinion to support health policies in specific areas. *For an accurate understanding of causes of death and illness, which is preliminary to action for prevention, the vital facts are needed for narrower, more homogeneous areas.*

The unit for tabulation and analysis should be a sanitary area, with relatively homogeneous conditions. It should be permanent in order that frequent comparisons may reveal changes in health facts in relation to changes in population, sanitation, housing, occupation, intelligence, medical and preventive agencies, etc. It should be small enough to insure as much similarity as possible in the chief conditions which affect health, but should include enough population to render accurate for statistical purposes the rates of mortality and morbidity. The minimum number of people

necessary for the calculation of a reliable death-rate, according to the categories of age, color, sex, nationality, cause, etc., which are considered essential, is a statistical problem for discussion in this meeting. This decision should govern the minimum size of the district.

The sort of analysis just suggested and the criticisms advanced by Doctor Hoffman, in the paper referred to above, really point to a function of the Bureau of Records very different from the present and much broader in scope. The records, up to the present time, have not been adequately utilized for scientific and practical purposes by the various health departments of the United States. *It means adding to the function of record the function of research, but always keeping in mind the aim of the health officer—to throw light upon the causes of ill health—and always seeking to aid the official in accomplishing his aim and testing his success.*

SOME SPECIFIC USES OF THE SANITARY DISTRICTS FOR HEALTH ADMINISTRATION.

1. *The Study of Infant Mortality.*—The person who seeks to understand and control the causes of infant mortality and morbidity does not care to know the rate for an entire borough or ward. The possible factors are all too dissimilar in this area, and the favorable and unfavorable influences are hopelessly mingled. Where is the rate high, and, in this particular section of the city, what is the condition of the milk supply, how does the housing and sanitation com-

pare with other sections, what is to be learned concerning the intelligence and income of the families, the nationality and work of the mother, etc.? Knowing these facts for comparatively narrow areas and comparing them may show the causes at work to produce either a low or a high rate.

In the experimental stages of the location of milk stations, they were established where the need was great as estimated by a survey of the important factors unfavorable to the health of infants and where the rate of mortality was known to be high. The purer milk dispensed at the station, the instruction of the mothers at the station and in their homes, the medical care of the babies, and the improved sanitation as a result of the station's activity, reduced the number of infant deaths and prevented sickness. The vital facts of this little community showed the milk station to be a successful experiment. The intimate knowledge of the factors unfavorable to the health of infants in that part of the city should become a valuable asset in the campaign of prevention. Each new record of the vital facts measures the progress of the movement. If the rate is calculated for the entire ward or borough, the establishment of milk stations will result in a reduced rate, and yet some very bad conditions in certain parts of the ward may be concealed by the very good conditions in other sections. To average results over wide areas with heterogeneous conditions is always dangerous and likely to mislead.

The calculation of an infant mortality rate over smaller areas involves

the tabulation of births in these same areas. This record would facilitate a study of variations in the birth-rate and their significance.

2. *The Study of Specific Causes of Death and Sickness or Disability.*—The mortality or morbidity rate from tuberculosis for a borough or a ward of a city is not significant to the investigator of causes or to the health department whose business is to prevent. It is important information if a high rate in a certain section be found associated with bad housing, dangerous occupations, or inadequate facilities for the care and supervision of advanced cases. In this case, also, if rates are calculated for too wide an area, the conditions most dangerous may be partially concealed by the showing of the best sections. Although it is recognized that tuberculosis is an occupational disease, our city health departments, in their published reports, throw no light on the relation of deaths to occupation. The mass of morbidity data recorded in hospitals and in tuberculosis clinics concerning the victims of this disease is not analyzed, as a rule, with a view to showing the relation to living or working conditions or to nationality or race.

3. *The Relation of Housing to Health.*—It would be readily admitted by all that the type of dwelling and the number of occupants have a very close relation to health. In construction, ventilation, sunlight and sanitation are fundamental; in use, the number of persons per room and their intelligence and habits are important. The health departments in

the United States have practically no data concerning the relation of room-overcrowding to health. The experience of European cities, where such data are recorded and analyzed—for instance, the city of London or the city of Leipzig—shows an increasing death-rate with the increase of the proportion of overcrowded dwellings. This is especially true of infant deaths and consumption. The report of the special housing committee of the Boston-1915 movement,—issued in 1910 (p. 18)—attributed much disease and mortality to the congestion of the North and West Ends, where the rates were higher than elsewhere. The problem of measuring the effect of housing on health is difficult because of the many other factors involved, but an intensive study over comparatively narrow areas and the comparison of these results would probably yield valuable information which would furnish strong support for a movement for city planning and for stricter building regulations.

4. *The Control of Contagious Diseases.*

—Isolation in special hospitals and by quarantine in the homes are the two methods employed to control contagious diseases. The mortality or morbidity rate for scarlet fever, calculated for the entire city or a borough, does not give the health official complete information as to the situation. The larger area may make a favorable showing and yet there may exist serious need for another contagious disease hospital more accessible to certain sections. To bring out this need, analysis of the facts concerning contagious diseases should be

made over narrower areas. In some sections of the city the population may be so dense that quarantine in the homes is very ineffective. This becomes a peril to the health of the entire city. Such danger spots should be detected, and, if necessary, the hospital must be employed for isolation. To bring out the significance of variations in the contagious disease rate analysis for narrower areas would prove very helpful.

5. *The Study of Vital Facts According to Nationality or Race.*—It is of the

utmost importance to measure the effects of the new environment upon the health of immigrants, or the effects of the urban life upon the health of the colored people as they flock to the cities, both North and South. It is not enough to calculate the death-rate from tuberculosis for Negroes, Italians or Jews in the entire city. They may be susceptible to the disease or comparatively immune from it because of conditions from which they have come or because of racial characteristics. On the other hand, they may be affected by the new surroundings—where and how they live, what occupation they follow, their ignorance, and their changed habits and manner of life. Different mortality and sickness rates should be analyzed in connection with the varying environmental influences. Some of the differences in health attributed to race may be accounted for by the environment—a factor more capable of modification in the campaign to improve health.

The need for more intensive study over smaller areas of the facts concern-

ing sickness, disability and death has become imperative for the health departments, especially of the larger cities where conditions are so complex.

With knowledge and efficiency, effort and funds may be concentrated where they are most needed and where they will yield the largest returns.

PART II. WHAT HAS BEEN DONE IN THE UNITED STATES TOWARD ESTABLISHING SUCH SANITARY DISTRICTS.

1. *Work of Dr. John S. Billings at the Eleventh Census, 1890.*—Under the direction of Doctor Billings, who was in charge of the Vital Statistics of the Eleventh Census, several special reports were issued, presenting detailed studies of the vital facts of some of the larger cities. These reports included features which were new in census work. The most interesting departure from former practice was the subdivision of these cities into *sanitary districts* and the analysis of the vital facts in relation to the immediate surroundings, among different races and classes of people.

Taking the older city of New York (Manhattan and Bronx boroughs) as an illustration, the twenty-four wards were subdivided into 114 districts, varying in size from 23 acres in the downtown section to 8,474 acres in the sparsely settled Bronx, and in population varying from less than a thousand to over fifty thousand (see map). The boundaries of the districts were fixed with the advice of the local health and police authorities, and "with reference to topographical features and character of habitation and of residents." For the calculation of mortality rates the mean population for the six-year period, ending May 31, 1890, was used as a base, and the deaths were compiled from physicians' certificates filed with the health de-

partment during the same period. Rates were calculated for each sanitary district, for the entire population, and according to color, nativity, and limited age grouping (under 5 years), and for certain important causes of death, *i. e.*, diarrheal diseases, consumption, typhoid fever, *etc.*



Maps were made of the city showing, by degrees of intensity of the shading, the variations in these rates among the various districts. There was included in the report, with the mortality facts, a somewhat detailed description of each sanitary district, setting forth area, number of dwellings, persons living per acre per dwelling and per family, together with a brief account of the character of the population and the uses to which the land was devoted, whether for residence, business or park space. The death-rates were calculated for the two age groups, under 15 years and 15 years and over, according to the birthplace of the mother, in the effort to show variations

in the influence of heredity as derived from the mother. Comparisons were drawn between the significant rates for the specific district and for the city as a whole.

The following table, compiled from the special report of the Eleventh Census on the Vital Statistics of New York and Brooklyn, will show the need of narrower areas than ward units for the analysis of mortality data, and, at the same time, will suggest some of the difficulties involved in working out sanitary districts. The sanitary districts of a single ward, the twenty-second, in Manhattan, are shown.

TABLE I.

MEAN ANNUAL DEATH-RATES, INCLUDING STILLBIRTHS, FOR THE SIX-YEAR PERIOD ENDING MAY 31, 1890, FOR SPECIFIC AREAS OF THE TWENTY-SECOND WARD, MANHATTAN.

Ward or sanitary district.	Size of district in acres.	Population of district in 1890.	Population of district under 5 years, 1890.	Death-rate of entire population per 1,000.	Death-rate of whites under 5 years of age per 1,000.	Death-rate from diarrheal diseases per 100,000.	Death-rate from typhoid per 100,000.	Death-rate from consumption per 100,000.
Ward 22	1,480	153,877	16,110	26.03	*	274.67	18.37	319.52
A.....	116	22,586	3,027	35.15	137.14	395.72	24.38	408.72
B.....	104	34,307	3,697	29.66	133.20	296.89	14.98	360.02
C.....	104	14,262	1,697	24.05	164.82	147.98	21.88	276.66
D.....	75	10,007	1,301	37.89	146.79	429.14	27.51	451.14
E.....	92	23,886	2,455	27.94	127.86	252.01	13.06	325.00
F.....	92	9,844	545	22.95	143.77	152.87	18.64	272.18
G.....	80	10,237	1,594	33.38	117.75	399.81	30.48	380.09
H.....	116	6,457	924	25.07	96.74	329.70	11.37	216.01
I.....	90	10,467	1,069	21.15	114.49	187.62	12.27	210.42
K.....	94	4,853	258	9.23	61.97	49.16	15.13	49.16
L.....	147	2,343	227	23.65	103.56	180.14	15.66	203.63
M.....	370	4,628	316	10.47	70.27	79.31	11.90	103.10

* Not found in the Report.

A glance at the above table will reveal the wide variations in the rates for various parts of the same ward. The rates for the entire ward do not measure conditions with sufficient exactness for the purposes of the sanitarian, the health official, or the practical sociologist. In this ward were grouped together business and residence sections, the latter differing widely in the surroundings that affect health. Widely different conditions of housing and sanitation are associated with a heterogeneous population from the point of view of occupation, intelligence and nationality.

THE RELIABILITY OF THE RATES FOR THE SANITARY DISTRICTS.

A reference to the table just presented shows that the total population of the different districts varies from two to thirty-four thousand, and that the number of children under 5 years of age varies from 227 to 3,697. The statistician at once raises the question as to *whether a reliable general death-rate can be calculated on a basis of 2,000 persons or a rate for children on a basis of 227*. Even if this point were settled in the affirmative, which would probably not be the case, *the serious question of comparability still remains between the various rates calculated for the different districts on such widely varying bases*. Not only is it a question whether the rate under 5 years, for district I, is a reliable rate at all, but is it comparable in reliability to the rate for district B with over sixteen times as many children? Are the general rates for the same two districts comparable when a similar

disparity in total population exists? In answering these questions it will be desirable to know the actual number of deaths annually in the various districts.

The population facts in Table I are for June 1, 1890, while the mortality data in Table II are averages for a six-year period, ending May 31, 1890. The Special Report does not publish the mean population for the six-year period, from which the rates of Table I were actually calculated. The rates

TABLE II.

AVERAGE ANNUAL NUMBER OF DEATHS,* INCLUDING STILLBIRTHS, FOR THE SIX-YEAR PERIOD, ENDING MAY 31, 1890, IN SANITARY AREAS, TWENTY-SECOND WARD, MANHATTAN.

Ward or District.	Deaths from all causes.	Deaths under 5 years.	Deaths from diarrheal diseases.	Deaths from typhoid.	Deaths from consumption.
Ward 22	3,637	1,788	384	26	446
A.....	671	359	81	5	84
B.....	861	426	93	4	112
C.....	290	99	19	3	36
D.....	321	166	39	2	41
E.....	565	272	55	3	71
F.....	191	68	14	2	24
G.....	289	162	37	3	35
H.....	136	77	19	1	13
I.....	187	106	18	1	20
K.....	38	14	2	1	2
L.....	47	20	4	.5	4
M.....	41	19	3	.5	4

* The total deaths for six years are given in the special report of the Eleventh Census for New York and Brooklyn. To calculate average annual deaths the totals were divided by six. The result is in integers and less reliable where small numbers of deaths are involved.

in the following Table III are calculated for the purpose of illustrating the relative reliability of the rates of the different districts, using the population of 1890 and the average annual deaths for the six-year period preceding, as found in Tables I and II. It is clear that the resulting rates are not the actual rates of Table I. Now, observe the changes in the rates produced by a variation of one death in districts L and B, the two districts with the extremes of population and number of deaths, both at all ages and under five years.

As shown by the calculations of Table III, a variation of a single death does not affect at all the general death-rate of the more populous district B but it causes a difference of

TABLE III.

COMPARISON OF DEATH-RATES IN DISTRICTS L AND B, AT ALL AGES AND UNDER FIVE YEARS, WHEN AN ARBITRARY VARIATION OF ONE DEATH IN EACH DISTRICT IS INTRODUCED.

<i>General rate at all ages.</i>	<i>Rate per 1,000, District L.</i>	<i>Rate per 1,000, District B.</i>
General death-rate, using data in Tables I and II.....	17.5	25.1
General death-rate, after subtracting <i>one</i> from deaths of each district, as in Table II.....	17.1	25.1
Difference.....	.4	0
<i>Rate under 5 years.</i>		
Death-rate under 5 years, using data Tables I and II.....	88.1	115.2
Death-rate under 5 years, after subtracting <i>one</i> from deaths under 5 years in each district..	83.7	115.0
Difference.....	4.4	.2

.4 in the case of district L. A variation of one death under 5 years causes a difference of only .2 in the death-rate for children in district B, but changes the rate for children in L to the extent of 4.4 per 1,000. It would appear, from these calculations, that death-rates based on too small a population in the district are not reliable to the same degree as if based upon a larger number, because they are more affected by chance fluctuations. A rate under 5 years, based upon 227 in that age group, if it be a death-rate at all, does not appear comparable with a rate in another district based upon 3,697 children under 5 years. A glance at other columns of Table II will emphasize still more serious difficulties, if various causes of death be examined according to sex, color and age, in a district having a population as small as district L, or even considerably larger. The number of deaths and the population base in each category become so small that the resulting rates are unreliable and entirely incomparable with the same sort of rates for more populous districts. A great change in the rate may be due to a variation of only a very few actual deaths, which has no particular relation to surrounding conditions, or to the character of the population. *Rates calculated upon too small a base are likely to mislead, therefore, just as surely as do the rates over too wide an area, such as the ward or borough.*

2. *Work of the New York Federation of Churches and the Federal Census Bureau at the Thirteenth Census and since that Time.*—In 1906, the New

York Federation of Churches, through its Population Research Bureau, started a movement to induce the Federal Census Bureau to give the population of the city, at the approaching Census, a neighborhood tabulation. The Census authorities agreed to tabulate all the population data for New York by tracts, as suggested and approved by the Federation. The Greater City was divided into 707 districts, measured by planimeter and verified by the city authorities, which were certified to the Federal Census authorities by the Federation. After the enumeration had been made in 1910 by the Census Bureau,* lack of funds prevented the preparation and publication of the results of the tabulation by small tracts. The Census Bureau published the facts for assembly districts, a unit entirely unsuited both for the purposes of the Federation and for the analysis of health data. Therefore, in this emergency, the New York Federation of Churches assumed the expenses of the preparation and publication of the data by the small tracts.

Their purpose, as stated by their Secretary, Dr. Walter Laidlaw, who edited the volumes containing the population facts, was "a statistical basis for demographic studies of Greater New York to guide the location of churches, settlements, hospitals, recreation centres and all other forms of voluntary welfare work, as well as to guide the location of schools, playgrounds, markets, water and sewerage disposition centres and methods." It will be

observed that no specific mention is made of the health department and the analysis of its statistics.

The area of these tracts ranges from 40 acres average, in the populous districts, to square mile multiples in the sparsely settled sections. In Manhattan and Bronx, *the population of the different tracts varies from less than a thousand in some of the downtown business districts to 45,000 in the crowded East Side.* There are a large number of districts with less than five thousand. These extremes of population are quite similar to the differences found in the tracts used by Doctor Billings.

As published, the population data include age grouping for each district in divisions, 1-5 years; 6-9, 10-14, 15-17, 18-20; over 20; sex, color, nativity and parent nativity, number of families, number of dwellings, persons per acre, families per dwelling, persons per dwelling, illiteracy, and year of immigration of foreign born whites.† It will be observed that the age grouping adopted is not adequate for the analysis of mortality data. The first group includes up to six years, the legal school age, a grouping that is not in common use in health statistics. There is no subdivision after 20 years.

NEW YORK CITY HEALTH DEPARTMENT, DIVISION OF VITAL STATISTICS, ADOPTS THESE DISTRICTS FOR ANALYSIS OF THE 1915 MORTALITY AND BIRTH STATISTICS.

Recognizing the ward unit as unsuited for the analysis of vital facts, the Registrar, Dr. Wm. H. Guilfoyle,

*Tract enumerations were also made in Boston, Philadelphia, Baltimore, Pittsburgh, Cleveland, Chicago and St. Louis.

†See Statistical Sources for Demographic Studies of Greater New York, 1910, New York Federation of Churches, 2 vols.

has decided to use the areas marked out by the Federation of Churches, with their population facts, as enumerated in 1910, as the basis for mortality rates for the year 1915. The following table, compiled from the Federation's Volume I and from the unpublished sheets of the Division of Vital Statistics of New York City Health Department, will be of interest. The same part of the city, the twenty-second ward, the facts for which were presented in Tables I-III, is covered in the table below;

according to new tracts, which do not coincide with those used by Doctor Billings, in their individual boundaries.

A glance at this table will show the wide variations in the rates, which suggests conditions that should not be grouped together in a ward rate. But we observe the wide variations in the number of people living in various districts, and in the number of children from 1 to 5 years of age. We are led, therefore, to *question the reliability of the rates in themselves*

TABLE IV.

MORTALITY RATES FOR FIRST QUARTER, 1915, BY SANITARY DISTRICTS OF THE TWENTY-SECOND WARD, MANHATTAN, ACCORDING TO POPULATION OF 1910.

District number.	Total population in 1910.	Children 1-5 years in 1910.	General death-rate per 1,000 of 1910 population.	Death-rate 1-5 years per 1,000 of that age in 1910.	Rate for pulmonary tuberculosis per 1000 of 1910 population.
89	12,836	1,127	20.23	50.4	2.5
91	8,405	1,128	23.17	28.8	8.7
95	15,778	1,665	14.40	24.3	3.3
97	11,354	1,655	20.02	41.7	3.9
101	13,806	1,439	32.04	73.3	5.9
103	7,727	1,129	26.26	57.5	4.2
107	11,939	1,055	26.17	46.1	4.4
109	4,305	599	26.39	74.5	2.8
*113	7,533	1,224	38.09	72.9	2.7
*115	8,037	998	36.86	113.9	5.1
117	8,627	634	19.75	19.2	2.4
119	4,814	579	25.29	35.0	4.2
121	6,305	294	19.30	41.4	1.9
123	11,688	1,697	18.06	43.0	3.1
125	5,974	193	14.29	42.1	none
127	4,184	119	13.58	none	1.0
129	5,568	214	13.12	none	.7
131	3,466	147	12.88	27.6	none
133	4,914	179	18.99	45.3	1.6
135	5,267	293	13.10	13.8	none
137	8,672	463	13.57	26.3	none
139	6,957	355	10.49	none	1.8

* Colored districts.

and for purposes of comparison, just as in the case of Doctor Billings' work in 1890. This area includes a great variety of housing and sanitary conditions, and extremes in the character of population. Comparisons, therefore, are of the greatest importance. It will be seen that district 127 had only 119 children, 1-5 years, while district 123 had 1,697 in this age group. Rates in these two districts are not equally reliable, as shown by the analysis in Table III. It is unnecessary to add to the calculations there presented.*

It will be observed that the divisions of this twenty-second ward in Table IV are more in number than in the case of those used in 1890. No district in Table IV has more than 16,000 population, which is just half the number of the most populous district used by Doctor Billings. Therefore, the question as to the reliability of even the general death-rates for these districts, used in 1910, may rightly be questioned. In a discussion of this point, by the Advisory Committee of Statisticians for the Division of Vital Statistics of New York City, some months ago, it was agreed tentatively that a district should contain at least 25,000 population, in order that its mortality rates, when calculated for various categories of age, sex, color, cause of death, etc., should be thoroughly reliable.† These are technical

problems which this meeting should discuss in greater detail.

These districts, determined by the Federation of Churches, were not primarily intended for the analysis of vital statistics, but they do constitute a step in the direction of tabulating our population data in such a manner as to make possible a more accurate understanding of the relation between health and welfare and the surrounding environment and the character and activities of the population. It may be necessary to make other combinations of these smaller units into larger, for the uses of the Health Department, Division of Vital Statistics, in order to secure reliable rates of mortality; but the value of the work already achieved, which is briefly described in this paper, remains. It is hoped that federal and state census authorities may coöperate in the future to furnish population data for these narrower areas every five years, for the larger cities of the country, and that the health authorities in many cities may realize the advantages of using these same areas for the tabulation of their vital facts. Thus sanitary areas of a permanent character would be established for the collection and record of a great variety of information, much of which, when properly related to mortality and sickness data, would greatly aid the active work of health officials.

*In the first quarter of 1915, if one be subtracted arbitrarily from the deaths 1-5 years of age in district 123 where the children number 1,697, the death-rate for this age group *will be changed only .6*; but if one be subtracted from the deaths 1-5 years of age in district 131, where there are only 147 children, *it will change the death-rate 6.8 per 1,000. The rate in the one district is much more subject to chance variation than in the other.*

†The experience of the New York City Department of Health, in the analysis of the mortality data for 1915, has led to the decision to combine the smaller areas in such a manner as to secure a population of about 40,000 as a basis for mortality rates.

Discussion.

SHIRLEY WYNNE, M. C., *Assistant Registrar, New York City Health Department.*

Doctor Chaddock has ably presented all the arguments in favor of smaller health districts, and I think that those of us engaged in health work in the large cities are convinced of their need. The details of the plan, however, are not as yet satisfactorily settled upon, and discussion of such points as the size of the proposed districts is desirable.

As the result of our experience of six months with health districts, we feel that the districts should have a population of between 40,000 and 50,000 inhabitants in order to avoid fluctuation due solely to paucity of data. In many parts of the city this has necessitated joining two or more of the forty-acre tracts. Care, however, was exercised to maintain the characteristics of the districts brought together by combining only such districts as were alike in the nationality of the inhabitants, alike in housing, alike in sanitary, social, and economic conditions. In a few districts, conditions were found that seemed to warrant maintaining them as separate districts even though their population was very small. For example: the third district, which contains the only Syrian colony in the city, and the fifteenth, in which Chinatown is located, the only Chinese district in the city.

Our experience also leads us to feel that even with health districts containing 40,000 or 50,000 inhabitants, the quarterly and even the semi-annual rates will be of little value as a basis for departmental action having for its object the permanent reduction of the death-rate. Of course, epidemics can be immediately detected in districts of any size, but in attacking the social and economic conditions exerting an influence on mortality, only the analysis of yearly figures will indicate their nature and their remedy. In studying the figures in one of the negro sections for the first quarter of the year, it was found that the death-rate of the colored population was practically twice that of the

white population, which was in accord with our accepted theories of the mortality figure. The following quarter, however, the figures were reversed; that of the white population being twice that of the negro.

One of the first things that appealed to us was the desirability of computing infant death-rates on the births occurring in each district. This necessitated redistributing the births that occur in the maternity hospitals according to the district in which the mother lived at the time of admission to the hospital. It, of course, would be unfair to credit all the births occurring in a maternity hospital to the district in which the hospital was located. It is also evident that a larger percentage of persons from the poor district will seek hospital care during confinement than from a district in which live those that are blessed with the good things of life. The deaths reported from institutions must, of course, be redistributed. This has been done in New York City for many years.

Briefly then, our conclusions based upon a short experience of six months are:

First, the basis of division should be one of area and not one of population.

Second, the districts should be as large in population as possible without sacrificing the homogeneity of the districts.

Third, under no circumstances should the homogeneity of the district be sacrificed, no matter how small the resultant districts may be.

Fourth, only yearly figures will be of value in discovering and attacking social and economic conditions affecting mortality.

Fifth, births and deaths occurring in hospitals must be redistributed.

Sixth, preventable diseases should be tabulated according to sanitary areas, and morbidity and mortality rates computed for each disease in each district.

SOCIAL ASPECTS OF INDUSTRIAL HYGIENE.

BY DONALD B. ARMSTRONG, M. D.,

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Read before the Industrial Hygiene Section, American Public Health Association, Rochester, N. Y.,
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The Journal has already published a paper by Doctor Armstrong on the Social Aspects of School Hygiene. It is therefore a pleasure to present this article dealing with similar features in industrial life.

THE modern Christian religionist, if he is willing at all to violate the fundamental principle of resisting not evil, to the extent of leaving for the time being constructive work for the purpose of testifying *against* something, will be found associated with those who are opposing *social* evils. This is in distinct contrast to the strictly individualistic "personal salvation" methods of a generation ago or of those theologians who, representing exhausted theories, have not yet had time to die off. Our sins of today are *social* sins, such as child labor, prostitution, the prevalence of tuberculosis in industry, etc., rather than the much simpler and more convenient (for the preacher) sins of a few decades ago, such as gambling, Sabbath breaking, etc.

In the same way, when one looks at the problem of public health in general, or perhaps in particular of industrial health, in a broader sense, it must be realized that the physical and mental ills that seemingly in an isolated way affect the individuals under observation, are also in reality evidence of *social* defect. They are, for the most

part, social diseases to be controlled by social instruments. Lead poisoning in a white lead works is directly, so far as the individual is concerned, the result of a lead-impregnated system; on the other hand and indeed more fundamental, the existence of lead poisoning in a group of factory workers is indicative of such predisposing factors as defective social organization in the industry, lack of a preventive sense of social responsibility on the part of the employer or director, and a deficiency of social control by the state over the working environment of its citizens. Health defects are for the most part a manifestation of social disease to be controlled by social instruments. Eventually most, if not all disease, including industrial disease, will probably be looked upon as a social defect and in this broad sense, therefore, all preventive medical or constructive health work is of profound social significance.

To turn to the consideration and practical interpretation from a social and economic point of view, of certain phases of health, and particularly of industrial hygiene work, one does not

have to search far for illustrative material. Before proceeding with the general theme, however, one or two more or less haphazard observations may lend emphasis to the argument for a social interpretation of modern industrial phenomena. Perhaps with no special justification, one thinks almost first of the relationship of women to industry in modern times and of the increasing complications and responsibilities in this field. The modern factory system, having grown out of handicraft production, and the more primitive domestic production, has brought with it many serious problems, the least important of which is by no means the question of female industrial labor. Leaving out of consideration the extreme conditions in our southern states and considering jointly for the time being the questions of woman and child labor, it is interesting to note that in Rhode Island, a typical northern industrial community, the 1910 statistics disclose a surprisingly large number of women and children in industry. Of the total industrial population over 16 years of age, 36,000 or 32 per cent., were women, incidentally, as regards this particular factor, the highest percentage in the United States. There were in that year 5,000 children under 16 years of age working in Rhode Island, 4 per cent. of the total industrial army—the largest percentage in the United States with the exception of the child-labor-cursed southern states of North and South Carolina and Georgia. Unable adequately to protect themselves, especially susceptible to many forms of industrial disease, this por-

tion of the industrial workers should make a specially urgent appeal for protection to the conscience of any community.

Another thing of social significance, to be mentioned now only in general terms, is the intimacy of relationship and the interdependency between home and factory conditions. It must be remembered that the average man in the United States is an industrial worker, having a family dependent for its health, education, progress and happiness, to a large extent at present, upon the man's working conditions. It is easy to understand the inevitable social and economic reactions between the work and the home. We must remember, also, certain very specific relationships such as the direct reaching of industrial disease itself through the worker into the home and to its members. Everyone is familiar with the symptomatic picture of lead poisoning—its anemia, discolored gums, paralysis, blindness, and insanity. This may be a picture of the male worker, poisoned with the metal. On the other hand, there have been many cases recorded where the disease has been acquired by the wife, even though her only contact with the lead industry was through the washing of her husband's lead-impregnated clothes, a poisoning preventable by the provision of factory dressing rooms and the insistence of a change of outer garments upon leaving the factory. Of far greater moment than this, however, though unfortunately less immediate and dramatic, are the economic and social home sequelæ of evil industrial conditions, such as incom-

petency, illiteracy, dependency, disease and crime.

There are many things to be realized in a complete consideration of the social aspects of industrial hygiene, only the seemingly more important of which can be touched upon here. Before considering the strictly social phases of the problem, however, there are certain closely allied factors of more immediate economic significance which ought, at least briefly, to be summarized.

1. THE ECONOMY OF PREVENTION.

Before a section of the American Public Health Association it is assuredly unnecessary to say more than a word on this subject. In all phases of health work we have been preaching prevention rather than palliation, prophylaxis rather than cure, and it is gratifying to observe that those principles, motivated by economic rather than human considerations, are very effectively permeating the field of industry. Regardless of motive, all welfare work in factories, whether the result of kindness, a desire for efficiency, the taste for philanthropy or the fear of higher wages and shorter working hours, would seem to be, subconsciously at least, a recognition of the economy of disease prevention in industry.

2. THE NECESSITY FOR HUMAN CONSERVATION.

The American Association for Labor Legislation has estimated that there are about 33,500,000 industrial workers in the United States, and that they lose each year because of sickness,

about 284,000,000 days. It is estimated that the total yearly financial loss, including wages, loss to industry and medical cost, is \$772,857,000. This is not only a tremendous loss in efficiency, a great economic waste and an extremely poor conservation of human resources, but it is placing unnatural and unnecessary limitations upon the social and economic welfare of the most vital part of our national structure—the great mass of workers. It is conservatively estimated that at least one third of this disability is easily preventable. We are just now realizing that this prevention is not only possible but worth while.

3. THE VALUE OF SOCIAL INSURANCE.

Known to all are the substantial reductions in the number and severity of industrial diseases and accidents where, as in England and particularly in Germany, an adequate system of state insurance has been established. When the employers' insurance premium is rated according to the health hazards he maintains in his factory he is more than likely to see that those hazards are reduced to the minimum. Thus, insurance, besides lending security to those unfortunate individuals who succumb to unavoidable industrial accidents and disease, has a distinctly constructive, preventive influence on factory conditions and a consequent effect upon the human wastage in industry. Fortunately, in this country our state legislatures are moving forward from the field of employers' liability to the legislative realm of workmen's compensation. It is hoped that the legislators will

realize, as do all industrial hygienists, that the next urgent step in our comparatively backward industrial organization is the application to industry of the sickness insurance prophylactic.

On the distinctly social side of the question there are a number of points, many of which are generally applicable to all health work and a few of which are of special significance in industrial hygiene. Perhaps we can most briefly itemize them as follows:

(1) *Causes Direct and Indirect.*

In all health work, in anti-tuberculosis campaigns, in infant welfare agitations, in the elimination of physical and mental strain, fatigue and the neuroses of industry, it is essential that we be not blinded to the underlying, indirect economic and social factors in the etiology of our problem. In health work one finds without difficulty many questions which are on the surface apparently straightforward health and disease problems, and in connection with which, because of the imperativeness of the health aspects, those interested in their solution fail to recognize, and consequently do not attempt to deal with the underlying etiological factors, often of a distinct social and economic character. Such seems to be true, for instance, of much of our industrial hygiene work, perhaps particularly the attempt to control tuberculosis in industry. The workers are frequently concerned exclusively with the direct exciting causes, such as bad food, improper diets, lowered resistance, poor light

and ventilation, filthy toilets, congestion, spitting, etc.

For the most part those interested, suffering from the almost inevitable myopia associated with close contact with the details of the problem, fail to see it in its entirety. They do not see the necessity for the correction of such predisposing factors as the inadequate family income, lack of adequate instruction regarding economic expenditures for and the proper use of foods, our unimaginative, individualistic, competitive system of industrial organization, the economic dependence of the mothers of the race, etc. In this problem there are very few directly causal conditions which are not traceable to these underlying factors. From them arise ignorance, poverty and unwise employment. To them may be traced bad housing, insanitation and crime; alcoholism, disease, bad feeding and exposure. Poverty, ignorance and destitution are frequent factors in all kinds of ill health. Should ignorance be enlightened and destitution made impossible? Pretty far from industrial pathology? Yes and no! Far from the palliative treatment of this social disease, far perhaps from the *direct health treatment* of it, but very near the economic and social heart of the cure of the great socio-health defects of which industrial disease is one.

(2) *Suppression vs. Construction.*

In great part the types of health work we have been used to in the past have been of an eliminative, suppressive character. In school hygiene, for instance, we first attempted to control

the communicable diseases. Of late, however, we have given much attention to the elimination of non-communicable defects and we are now emphasizing the use of prophylactic dental clinics, the physical training of normal, healthy children, the prevention of improper and insufficient feeding and the resultant malnutrition, by the establishment of lunches in the schools, etc. The same principle of constructive action is being applied to industrial hygiene. The old type of factory owner in the New York loft building is satisfied with a gas stove upon which the employees may boil some coffee at lunch time; on the other hand, the National Cash Register Company, for example, provides, in connection with a perfectly equipped lunch room, an adequate and beautifully furnished space for noon hour rest and recreation. The Standard Manufacturing Company of Pittsburgh not only provides shower baths, where industrial dusts may be washed off and industrial disease *suppressed*, but it adds to its equipment a beautiful bathing pool where health and resistance to industrial disease may be *constructed*. Thus modern constructive, creative health work presents a previously lacking social content. It indicates the realization of the social value of healthy individuals. It is attempting to lay a firmer physical foundation upon which the world may hope to see constructed a finer social state. It realizes that without a physically sound sub-strata, social evolution is bound to be abortive. It is from this point of view that health

work is of very high significance when socially interpreted.

(3) *Education.*

Of course the very mechanism of practical health administration depends for its effectiveness entirely upon certain social instruments, the greatest of which is popular education. In industry, coöperation and sympathetic understanding have accomplished much. The educative method is undoubtedly fundamental to the spirit of democracy. Recently in New York City, in food sanitary work, for instance, the value of constructive educational methods over the usual system of non-instructive visits, prosecutions and fines has been amply demonstrated. The recently established Division of Industrial Hygiene of the Department of Health has fortunately followed the same educational tact. The furriers are being called together in groups by the Health Department officials and instructed as to methods of dust prevention and removal. To the laundry workers are issued educational leaflets describing the needs and methods of protection against soiled garments, the infection of open wounds, the sterilization of infectious material, etc. Such work is essential if industrial reform of a lasting character is to come from the bottom up. It is at least a necessary counterpart of such industrial superstructure reorganization as is involved for instance in a system of state insurance. Further, it is one of the ways of making the reporting of industrial disease actually effective, for with an understanding of the situation, the

demand for the report is going to come from the patient himself.

4. THE SOCIALIZATION OF INDUSTRY.

For the most part the civilized world is reasonably democratic in its religious and political organization. The one great field, however, into which democracy has scarcely penetrated is that of industry. While we have almost everywhere else acquired the attitude of looking at any special problem from the evolutionary point of view, and while in many phases of life much progress toward the adoption of more socialized methods has taken place, on the other hand, in industry the old, more or less anarchistic individualism still prevails. The history of labor until recently has been individualistic, with a few notable variations. This is true of conditions both before and since the advent of capitalism and the factory system. Certainly capitalism and the great corporate developments of modern times are making necessary and indeed are paving the way for the next step in industrial evolution. This step would seem to be industrial socialization with greater power of state control, more direct social responsibility, and the organization of industry so that its perpetuation and survival will depend upon its value and fitness to society. However, ignoring for the present the possibilities in coöperation, communism, and the communistic anarchy of Kropatkin, the industrial world now would seem to be faced with two main channels for future developments. It is not at all certain that they are alternative channels:

probably both tendencies will be influential factors in the ultimate socialization of industry. We have in mind, in the first place, the logical development of labor unionism into industrial unionism in industry with its proposed syndicalistic method of representation in politics; and in contrast to that the program of so-called "socialism," which involves state control over the great necessities of life, and the education of the people into the ideals of service to the state. These two tendencies carry rather distinct and somewhat contrasted programs, and while it may be a long time before we consciously choose one path or another, nevertheless there does seem to be indicated here the two chief forces striving to mold industrial evolution. They are attempts to answer the many questions that are being asked of organized society with every increasing intensity. Is industry to be reorganized by the intelligent, coöperative sympathetic effort of a society with an awakened social consciousness, or is it to be seized and wrecked by the maddened and exploited? Is the spirit of gain to be replaced by the spirit of service or by the spirit of retaliation? Is class distinction to grow and class war to come, or are the classes themselves to be socialized into extinction? Shall it be the constructive evolutionary path or the destructive revolutionary one? Is the future industrial worker to be primarily a citizen serving "The Great State" or is he to be a member of a fixed labor class, first a worker and then a citizen, as embodied in the pitiable program of "I. W. W.-ism"

in industry and syndicalism in politics?

5. THE CONSCRIPT LABOR ARMY.

It is inevitable that part of the labor of the world must always continue to be comparatively uncreative and unimaginative. However, the ultimate cessation of immigration, more immediate impending events in the industrial world, point the way to the time, not far distant, when there will be no army of men always content to do "the dirty work" of the world. There is also a time coming when the state shall recognize the right of all individuals to work and grow socially and spiritually as well as materially—a thing scarcely possible for a man who is to be concerned with continuous drudgery or with one minute industrial process all his life. Is there a remedy for this condition? That is hard to tell, but there is a plan, outlined by William James, that calls for an industrial state in which no class shall toil unceasingly but, through a conscript labor army, everyone, man and woman, will have the preliminary years for education and development, will spend his allotted time doing the foundation work of the world under the direction of the state on a basis of service to all, and not for the financial gain of a few. All the big necessities of life such as transportation, mining, food distribution and production, etc., must come under government supervision. For the individual to work his allotted time in this great industrial army will be to perform a great and recognized service to the state. Thus may drudgery be regulated and ren-

dered innocuous. Here may be at last a legitimate field for militarism.

6. THE ALTERNATION OF EMPLOYMENT.

It should be realized that our industrial system involves not only a waste of money and men but also of energy and enthusiasm. The men in Rhode Island who are making pearl buttons and who have nothing but pearl buttons to look forward to for the rest of their lives are employed at a deadly, hope-killing occupation, and are quite naturally not going to put into that occupation any more interest and energy than is necessary. Is there a remedy for this? One has been suggested by an English writer and somewhat worked out by him in his discussion of the alternation of employments. This involves a periodic and progressive shifting from trade to trade, at least in allied industries, and requires of course intelligent governmental supervision, so necessary from every point of view, rather than the haphazard, anarchistic, industrial control or lack of control of today. This thinker believes, and certainly experience would seem to confirm it, that most men will work at a high pitch at a new thing, especially if they have in view a better thing to follow. In this way society would obtain both quantitatively and qualitatively a superior service from the individual, and as a result of the concentration would require less actual working time from the individual, thus allowing more time for the preliminary educational period, and, because of increased earning

capacity, a greater saving against the nonproductive old age.

7. THE IDEAL OF SERVICE.

Fundamental to future industrial development and to the inculcation of social methods in industry is that type of education which shall make it possible to supplant the spirit of gain by the spirit of service and which shall justify an industrial organization's existence on the grounds of its service to all rather than on a basis of its financial gain to the few. The government schools would seem, with logic, to be the ideal place to teach the spirit of service to the state and to society. Unfortunately, at the present time their value in this connection is almost entirely potential rather than actual. More effective channels and channels through which a great deal is being accomplished are the stage, pulpit and the novel. Perhaps we should call it inspirational teaching rather than education. It is a fundamental process and a very slow process. It would seem in reality to involve more or less of a change in human nature. But human nature has changed in the past and is changing now even though slowly. Industrial democracy is inevitable, even though its realization is not for the immediate future.

CONCLUSION.

What is the value of and the motive force for all the health work, in industry and out of it, that is now being undertaken? One can readily see that it has far-reaching social, economic

and moral phases. Evidently it is an attempt to make sanitation universal, to eliminate preventable disease, to perfect the social and individual health status. It means increased human efficiency, greater earning capacity, a normal social life and a better physical foundation for sound, social and spiritual growth. It indicates that society is attempting to meet its social responsibility by protecting the whole of human kind from the menace of its defective members.

Is it done, however, purely for the sake of the physical and mental health which will result? Is a pig in a clean pig pen any less a pig? Is modern society striving for cleanliness, decency and health solely because they are worth while ends in themselves? Is the fullest meaning of constructive health work to be found in its social, political and ethical interpretation, or does it have an even more fundamental significance? Is it not true that a healthy individual and a healthy society are the only adequate means or instruments through which may come a more perfect expression of the conscious life in the universe? The public health is not only inevitably entangled in the problems of economic readjustment and of social growth, but it is of intimate significance to both individual and social spiritual evolution. The health of the people, the physical and mental welfare of the nation, and of the world, are essential to the higher manifestation of conscious life, the *Elan Vital*, striving for a more perfect expression through the medium of the human kind.

RURAL SANITATION: DEFINITION, FIELD, PRINCIPLES, METHODS, AND COSTS.

W. S. RANKIN, M. D.,
Secretary, North Carolina State Board of Health.

Read before the Public Health Administration Section, American Public Health Association, Rochester, N. Y.,
September 8, 1915.

In this rather brief paper, Doctor Rankin outlines the problem which was the subject of an interesting and important session of the meetings at Rochester.

DEFINITION.

THE word sanitation refers to civic life; the term rural sanitation refers to rural civic life; the constituted and the common organ through which rural civic life finds expression is the county government; therefore, we may define rural sanitation as the administration of sanitary measures by or through the county government. Rural sanitation finds its parallel in urban sanitation, and county sanitation its parallel in municipal sanitation.

FIELD.

The field of rural sanitation includes more than 99 per cent. of the area and more than half of the population of the United States.

PRINCIPLES.

No. 1. Rural sanitation should be initiated by the state, but executed through the rural civic machinery, the county government. The state should initiate, because the state is the only existing force that can initiate rural or county health work. The county government must carry on the rural sanitation initiated by the state for

two reasons: First, should the states undertake to execute, as well as initiate, rural sanitary measures, all of the states, with a few exceptions, would soon realize that their undertaking was far beyond their means; second, no one, or no agency should do for others what they can do for themselves, as such practice leads toward dependence and indifference and away from independence and appreciation. The people are able, when properly shown, to care for themselves, and it is better for them to do this than to have it done for them.

No. 2. The independence of the county as a governmental unit demands a plan of rural health work that will permit the more progressive counties to go forward, liberating such counties from the possible retarding influence of the backward counties—in short, a plan that permits of leadership and healthy rivalry among counties.

No. 3. The multiplicity of rural governments is a great rural sanitary asset, affording a corresponding multiplicity of opportunity. There are 2,953 county governments in the United States, an average of 66 to the

state. The county governments of the average state hold over a thousand meetings a year; at practically all of these meetings the state's representatives are welcome and can get a hearing. If the state health officer has a reasonable proposition, with good argument behind it and not too big a budget in front of it, he can influence the county to take one, two, or three steps toward a cleaner civic life. Every meeting of the county government is a challenge to the state department of health to show the county its sanitary needs and how to meet them.

No. 4. Rural sanitation must be developed on a smaller budget than the budget for urban sanitation. The country is poor. What the exact difference between the urban and rural per capita wealth is in the United States, no one knows, but we do know that rural per capita wealth is much less than the urban per capita wealth.

No. 5. The influence of epidemicity is weaker in rural than in urban life, and rural quarantine measures need not be as rigid as urban quarantine measures.

No. 6. Rural sanitation will be influenced by the individualism of the country. The ruralite (a term more expressive than orthodox) is individualistic; the urbanite is communistic. The errors of individualism are best treated by education; the errors of communism are best treated by legislation; therefore, sanitary education is relatively more important in rural sanitation than in urban sanitation, while the reverse is true for sanitary legislation.

METHODS.

There are two general methods by which a county may have sanitary measures carried out: First, the county may do its own work; second, the county may have its work done by some outside agency. The whole-time county health officer is usually regarded as the best solution by the first method, while the unit or contract system of county health work furnishes, probably, the best solution by the second method. With the general principles of the whole-time county health officer plan of work this section is familiar; therefore, I shall economize time by limiting my discussion to the less well known unit system plan of county health work.

The unit system of county health work assumes, first, the divisibility of county health problems into fairly independent units of health work; second, that a county may get better work for less money by paying the state board of health just what it costs to complete a certain piece of work than by attempting to do the work itself. Several illustrations will make the practicability of the unit system clear and perhaps better appreciated.

Illustration No. 1.—The North Carolina State Board of Health proposed to and contracted with ten counties for a county appropriation of \$500 to administer free typhoid immunization to those citizens of the ten counties who wished to be immunized. In the first set of five counties we gave complete treatment to 26,537 people; when we complete the work in the next

five counties, 50,000 people in the ten counties will have been vaccinated against typhoid fever. This is about one-eighth of the population of the counties treated. In several counties about one-third of the population has been treated.

Illustration No. 2.—Our principal fall and winter work in rural sanitation will be executing contracts for the following unit of school work: For a county appropriation of \$10 for each school in the county the State Board of Health agrees to arrange through the county school authorities and with the teachers a program of consecutive *health days* for each school as follows: Two weeks before health day the principal of the school receives from the State Board of Health a batch of hand bills announcing a date and program for health day. The hand bills also carry an invitation to the patrons of the school to attend the exercises. The teacher distributes these notices through the children to the school community. The representative of the State Board of Health arrives at the school at 10 a. m. on health day. He makes a fifteen-minute talk to the children and visitors on the importance of a knowledge of the laws of health. He then makes a medical inspection of the pupils and gives each defective child a card to its parents, notifying the parents of the nature of the defect and urging the parents to see the inspector after the evening exercises. The inspector mails a report of the inspection to the State Board of Health, which, through a system of followup letters, keeps in touch with the parents of the defective

children until they are treated. The inspector then questions the children after the manner of the old-time spelling match on a health catechism, which has been supplied to the school in sufficient number at least one month prior to health day. The health day exercises then adjourn until 8 p. m., at which time the exercises are resumed. The evening exercises consist of from three to four short illustrated lectures by the inspector on the more important subjects of sanitation, interspersed with the reading of selected compositions by the school children. The last item on the program will be the awarding of prizes, the first for the best knowledge of the catechism and the second for the best composition. The inspector will grade, score-card manner, each school on the excellence of its showing, on health day. When this county unit is completed, a county prize will be awarded to that school giving the best coöperation in the work; a county prize will be awarded for the best composition, and another prize for the best knowledge of the health catechism. The inspector can handle one rural school a day. It will take two or three days to handle some of the larger village and town schools. In the first county to adopt this unit there are fifty-seven schools which will require a program of practically three months. The inspector will have very hard work for five days in the week, like all school workers, but like them will have Saturday and Sunday to rest. This unit of health work couples medical inspection of school children with the sanitary instructions of the entire community,

young and old alike—the young through the catechism, compositions, and lectures, and the old through the lectures, but most of all through the help the children will demand of their parents in learning the catechism, and in preparing the compositions.

This plan of contract county health work greatly increases the appropriation of the State Board of Health; an appropriation from a county is just as useful in doing health work as an appropriation from the state. This plan has great adaptability, and I might say extensibility in proportion to the ingenuity of the operator; under it a unit of infant hygiene work may be developed; under it a unit of anti-malaria work may be carried out; under it a unit of anti-pellagra work may be executed; under it many other more or less independent county health problems may be successfully attempted.

Comparative Value of Methods.—

The whole-time county health officer idea proposes a means—an officer; the unit or contract system of county health work proposes an end—the execution of the plans and specifications for a definite piece of work.

The whole-time county health officer idea, if carried out by the county authorities, is subject to local politics; if administered under state supervision it is in conflict with the principle of local self-government. The unit system of county health work is not subject to local politics and does not conflict with the principles of local self-government.

The whole-time county health officer plan costs the county from \$3,000 to

\$4,000 a year, and is available to only a comparatively few counties; the unit system of work costs the county from \$500 to \$2,000 a year, and is available to nearly all counties.

There are certain counties that should employ whole-time health officers, but the contract or unit system of county health work is better adapted to a variety of county conditions, and will be, in all probability, far more effective than the whole-time county health officer plan in reducing the state's death-rate. The unit system of county health work is important as a stepping stone to the whole-time county health officer. In leading up to the whole-time county health officer, the unit system standardizes county health work, so that, when a whole-time county health officer is employed, an effective plan of county health work will have been established.

COSTS.

The unit system of work or proposed contract submitted by the average state to the county should not call for an appropriation of more than \$1,000; \$500 is better. The smaller the cost of the unit, the greater is the probability of securing the funds with which to *start* county health work. After one appropriation is obtained the responsibility is then largely with the state for making such use of it as to pave the way for easier and more liberal funds. The game of sanitation, like the game of life, to use the other fellow's grammar, "is not in holding a good hand but in playing a bad hand good." Even the novice can get results with plenty of money. The

intelligent health officer never loses sight of relative values, and the real fun of the game is in getting big results with little budgets. We shall be able to handle the county contagious disease problem for the average county for \$300 to \$400 per year. We will

carry out the school unit for from \$500 to \$600 a year for the average county or for fifteen cents per pupil. We will have vaccinated 50,000 people in ten counties by September 11, for a cost to the counties of about ten cents for each person immunized.



VENEREAL DISEASE CONTROL IN THE ORANGES.

FRANK J. OSBORNE,
Health Officer, Orange, N. J.

THE clinic for the treatment of genito-urinary diseases was established at the dispensary of the Orange Memorial Hospital, July 1, 1914, after a conference between the Health Department and representatives of the Dispensary Staff. This was the culmination of sentiment of long standing, started and developed by Dr. Daniel W. Poor of the Board of Health. The agreement was to the effect that the equipment and maintenance of the clinic should be provided for by the Health Department while the physicians and treatment, together with the room, should be furnished by the Hospital. The plan was to have two doctors in charge, one for the care of gonorrheal patients, the other for syphilitics; and while we realized the desirability of having clinics for both men and women we thought best to confine our initial experiment to men leaving the women and children to be cared for in the day skin clinic as had been the custom.

At the time the clinic was opened a poster was drawn up stating in short, pointed sentences the purpose of the clinic, the place where held, the clinic hours, and warning against advertising quacks of all-kinds. These were printed in red in order to attract attention and tacked up in all the men's public toilet rooms in the city. A circular letter was likewise sent out to all the physicians in the Oranges, telling them of the clinic and asking them to refer any cases which they did not care to treat, for any reason, to the clinic in order that the might be advised and treated by competent attendants. As our purpose was primarily to provide a clinic where men

infected with these diseases might secure friendly and honest advice and treatment, we did not make these diseases reportable fearing that some might be prevented from coming if this were done. We did, however, draw up a case card for use by the clinic physicians and for our own office records. A pamphlet was also printed for distribution to patients, setting forth the necessary precautions to be followed by those infected with these diseases in order to prevent its spread to others and to effect a permanent cure for themselves.

As soon as it was made known that such a clinic had been established patients began to come from all the Oranges so that at the close of 1914—end of six months' trial—it was found that fifteen of the thirty-six cases treated were non-residents. This fact was made known to the health departments of East Orange, West Orange, South Orange Village and South Orange Township with the request that they appropriate their pro rata share of the money necessary to run this clinic. They all came in most willingly and since January 1, 1915, it has been run under a system of joint control by a Committee made up of representatives of the five Oranges similar to that for control of the milk supply.

There are two practices in force at this clinic which we have found most successful and essential in order to forestall the time-worn criticism of "pauperizing" our patients; and to conserve our funds. This applies primarily to syphilis since the treatment of gonorrhoea is comparatively inexpensive and nobody objects to the

nominal charge to cover the cost of these materials.

Whenever a patient suffering with syphilis applies for treatment he is asked to deposit enough money to cover the actual cost of the salvarsan necessary to be given in his case in the best judgment of the physician. If he claims he cannot pay anything, or only a part, his treatment is begun at once but the social visitor of the hospital is sent out before the time for his second injection to investigate as to his financial status and previous history. If it is found that he is able to pay the whole or part we insist upon it before further treatment; if not, it is charged against the Committee's account. This we feel is just, both to the physicians practising in the Oranges and to ourselves, for it is not our purpose to supply indiscriminate free treatment or to take patients already under the care of a private physician but rather to reach those who either would not or could not engage a reputable physician and who might, therefore, neglect treatment entirely or fall prey to an unscrupulous quack.

The other practice appears to us fully as important and makes it impossible to confuse our clinic with anything other than a public health institution. The question arose as to where the Committee should stop in the salvarsan treatment of individual cases for which it was responsible. One indigent case of tertiary syphilis appeared and soon had consumed over \$50 worth of salvarsan and it was pointed out that at that rate our appropriation of \$250 would be

very soon exhausted and that while it might be ideally desirable to carry on this kind of thorough treatment it was, however, impossible for health departments to take this attitude since their province was one of public rather than individual health and preventive rather than curative endeavor. After consultation with the clinic physicians it was, therefore, decided to clear up the acutely infectious cases with two or three injections of salvarsan and then continue treatment by the less expensive method of mercury and potassium iodide. This has been followed out ever since with most satisfactory results.

The G.-U. Clinic is looked upon by those interested as one of the most effective public health institutions in our midst and when one realizes that during the eighteen months, from July 1, 1914, to December 31, 1915, sixty-six cases of venereal disease have been treated, besides equipping the clinic, at a total cost of \$222.90, it will be seen that the expense of this work is insignificant when compared with the immense good accomplished. Twelve more cases have been under treatment during the first three months of 1916 which shows that the work of such a clinic is never finished, that new cases are constantly appearing which require attention, and that it is both the moral and health duty of every community to provide some means of dispensing advice and treatment to this class of patients who might otherwise be left to chance treatment or none at all, imperiling the other members of their own families as well as others in the community.

MORE TROUBLE FOR THE HOUSE-FLY.

As if the present indictments against the house-fly were not sufficient to warrant and demand his extinction, another sanitary crime has been laid at his door. T. O. Shircore, in Mombasa, British East Africa, has found that the fly is a carrier of the eggs of various intestinal parasites and that the danger from this source of infection is seriously to be reckoned with.

Examination of 100 house-flies from a native ward showed that ten carried in the intestinal tract the eggs of *Trichocephalus dispar*, *Tænia saginata*, or of *Ancylostomum*. One hundred flies taken from the police latrines showed eleven ova carriers, in this case the three already mentioned and *Schistosomum mansoni* as well. Fifty flies from the native hospital showed six infected with ova of *Trichocephalus dispar*,

Ancylostomum, and *Ascaris lumbricoides*. Twenty-five flies from the local meat market showed two infected with *Trichocephalus dispar* and *Ancylostomum*.

The most frequent ova were the last two. That ascaris infection was not more frequent was laid to the large size of the eggs, which are not so readily swallowed by the fly. It was found that the *trichocephalus* ova in flies withstood putrefactive changes for two months. Shircore very logically suggests the examination of the intestinal tracts of house-flies as a practical method of determining the ratio of helminth infection in a district where direct examination of the feces is not possible.—*New York Medical Journal*, May 13.

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THE LAG OF HEALTH LAWS BEHIND SCIENCE.

Education is taking the place of threat and prosecution in the prevention and control of disease but laws will be needed until the millennium comes. Efficient protection of the public health will always depend to a large extent on the summary exercise of the "police power" by local and state health officers or on the moral effect of the knowledge that this power can be used.

The statutes enacted by the state legislatures form the foundation on which this authority over persons and property must stand. The superstructure of detail governing the health officers in particular cases may also be supplied directly by the legislature or may be supplied by regulations of the state or municipal boards of health adopted under authority granted by the statutes.

In examining the health laws of various states, one is struck, first, with the archaic phraseology and the absurd emphasis on matters only remotely related to health. These relics of a prescientific age indicate that superstitions regarding the sources of disease die slowly. For example, the progressive state of Minnesota, so recently as 1913 enacted that "every building in which labor is employed shall be kept clean and free from *effluvia* arising from any sewer drain or privy." The popular belief that disease germs live a long time outside of the human body and that infection by fomites is of great importance is illustrated by "Mattress Acts" in almost every state from Massachusetts to California regulating the use of second-hand material in pillows and mattresses.

An equal fear of dead bodies and cemeteries as sources of communicable diseases is shown by statutes common to many states requiring the sanction of the state or local health department before a cemetery may be located or enlarged.

Of far more importance than instances of unnecessary legislation are the weakness or utter lack of statute foundation for regulations or procedures of prime importance. Great power is everywhere granted over "articles capable of creating sickness" but little is said of persons as sources of infection unless they are actually sick or are domiciled with those who are sick. Boards of health are largely helpless in dealing with incorrigible consumptives, typhoid carriers and persons exposed to infection. A hotel keeper in Massachusetts was upheld by the courts in refusing to show the hotel register to representatives of the State Board of Health at the time of an outbreak of typhoid fever among his guests.

The great importance of securing a medical examination of all persons engaged in the handling of food is just beginning to receive proper recognition. The return of "Typhoid Mary" to the occupation of a cook in a New York hospital with a resulting outbreak of typhoid fever is a recent illustration of this danger from typhoid fever. Dr. Cleaveland Floyd of the Boston Consumptives Hospital Out-Patient Clinic states that over 2 per cent. of the six thousand cases examined in the last seven years were cooks, waiters, bakers and others engaged in the handling of food and that one third of this number were proved to be throwing off tubercle bacilli in their sputum when they first came to the clinic. Like tuberculosis, syphilis may be spread by food handlers without our suspecting the source.

New York City has undertaken the medical examination of her ninety thousand cooks and waiters and has already obtained results which show this enormous task to be worth while. But few states have granted the broad police powers which have been conferred on the Department of Health of New York City. In Massachusetts, city and town boards of health are specifically empowered to require double impermeable floors for bakeries but the examination of food handlers is not mentioned and would probably require further legislation. This is also true in other states.

Assistant Surgeon-General J. W. Kerr has well said: "There is no use denying that many of the state health laws yet in force have to be stretched to the breaking point to cover actual conditions." The protection of our food supplies from infection and the efficient control of the acute infectious diseases as well as tuberculosis and the venereal diseases call for further legislation which shall restrict personal liberty. That such laws may be expected was indicated recently by the Court of Appeals of the District of Columbia which declared that "Measures looking to the public welfare are no longer tested by the strict letter of the Constitution. But public opinion, keeping pace with advancing civilization, is the progressive factor which calls for an enlarged invasion of private rights for the public good and which prompts courts to give greater elasticity to constitutional limitations."

THE PRESENT STATUS OF THE SCORE CARD OF MILK QUALITY.

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Read before the Laboratory Section of the American Public Health Association, Rochester, N. Y.,
September 10, 1915.

TWO years ago at the Colorado Springs meeting there was presented the plan of a Committee of the Official Dairy Instructors Association for the preparation of a score card of milk quality which should furnish us an acceptable basis for grading city milk supplies.

The Official Dairy Instructors Association is perhaps best known to you as the author of the dairy score card printed by the Federal Bureau of Animal Industry and used by the state of New York and many municipalities.

The limitations of this dairy score card as a measure of the quality of a city milk supply have long been recognized and have recently been pointed out in detail by Mr. Brew in Bulletin 398 of the New York Agricultural Experiment Station.

Recognizing that the present dairy score card did not offer a satisfactory basis for grading the products of a dairy, three years ago, the Instructors Association directed its committee to prepare a new score card for that purpose.

In sharp contrast with preceding efforts this committee decided to base its conclusions upon careful measurements of the factors involved. The magnitude and difficulty of this undertaking may perhaps be appreciated from the fact that approximately \$50,000 has already been expended upon these researches, and the undertaking is not yet completed.

Naturally such studies concern themselves with the sources of bacterial contamination and with the factors controlling the growth of the bacteria in the milk.

The contaminating influences of the barn have now been fairly surveyed. The results are given mainly in the publications of the New

York Agricultural Experiment Station. They may be summarized by stating that while the cow is important, the condition of the barn and its surroundings exert practically no influence.

The great influence of the germ life in the utensils in contaminating the milk was presented yesterday by Doctor Prucha, and the data will appear later in the publications from the Agricultural Experiment Station of Illinois.

The contamination of the milk up to the time it reaches the city is mainly due to the cow and to the utensils.

In practically all cases where more than twelve hours elapse between milking and sampling growth accounts for the larger part of the germs found. Accordingly, temperature control is the largest factor in controlling the germ life in city milk.

Extensive studies are now under way to determine the age and temperature conditions of the milk supplies of the cities of the United States.

After three years of committee work which were preceded by some years of individual work there is naturally some pressure for tangible results in the form of a score card.

During the present summer a tentative card for scoring the milk as it leaves the barn has been formulated and is now being tried in field studies. It is still too early to venture an estimate as to the date at which the finished score card will be in condition for general use.

This statement of the present status of the work would be incomplete if it did not include reference to the coöperative assistance of the International Milk Dealers Association, the Dairy Inspectors Association and the officials of a number of cities.

SOME OBSERVATIONS ON CAUSES OF HIGH BACTERIAL COUNTS IN MARKET MILK.

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New York, N. Y.

Read before a General Session of the American Public Health Association, Rochester, N. Y., September 7, 1915.

THE causes of high bacterial counts in milk are obviously the result of the operation of two factors—the advent of bacteria to the milk, and the growth of bacteria after they have gained entrance to it.

Bacteria have access to milk first, from the cow; second, from the barn surroundings; and third, from the utensils.

It will not be the scope of this paper to consider directly the part which the cow itself plays in the development of high bacterial counts.

A host of investigators have shown that the milk as drawn from the udder, even under the best of aseptic conditions, varies from a few to substantial numbers and kinds of bacteria. The term, "the high count cow," is well known to dairy bacteriologists and is usually applied to an animal in apparent perfect health with outwardly a normal udder, but in whose milk, freshly drawn, are found considerable numbers of bacteria.

From the exterior of the cow, variable amounts of the elements from the skin and its appendages and of the dirt and manure associated with the same, may carry into the product varying numbers and kinds of bacteria. The latter may very properly be denoted as the dirt bacterial flora in milk. It is doubtful

if any commercially produced milk is ever entirely free from them and the advent of moderate large numbers from such sources is doubtless possible.

Harding, Breed and others, conducting careful investigations under conditions where individual factors were alone subject to variation, have shown that such environmental barn conditions as the state of the air in the barn, the condition of the floor and the ceiling, are comparatively unimportant in influencing quantitatively the bacterial count in the milk. The Commission on Milk Standards of the New York Milk Committee have for some time emphasized the lesser importance of the "equipment" of the farm as compared with "methods" in affecting the size of the bacterial count, and methods, of necessity, relate to the conditions of the apparatus actually brought into contact with the milk.

From the work of Harding, Breed, Brew and others, we have become impressed with the great relative importance of the condition of the milk pails and other utensils, which come in actual contact with the milk, as factors in the development of high bacterial counts in milk. Here the chief and important point relates to the actual bacterial cleanliness of the utensil. During the last five years, the writer has had the fact impressed

upon him on numerous occasions, that the truly important, causative factor in the development of high bacteria counts in connection with industrial food operation can be traced to either improperly cleaned utensils with usually a subsequent growth of bacteria on their surfaces, or bacterial incubation in the food product through inefficient refrigeration or failures in other preserving processes.

In the summer of 1914, some of the product entering a milk plant in the City of New York, coming from certain creameries in the country, contained much larger numbers of bacteria than the standard of the Health Department of the City of New York permits in Grade B milk before pasteurization that is, above 1,500,000 per cc. Samples testing in the tens of millions of bacteria were common. It was deemed advisable to make investigations at the creameries to determine the causative factors for these high counts.

Prior investigations had shown that the bacterial condition of the milk cans returned from the creamery to the farmer represented an extremely important factor in this connection. In previous times each farmer was responsible for the cleaning of his own cans. The customary way of cleaning them is too well known to be described; it is sufficient to say that practically every intelligent farmer knows the necessity for having a reasonably clean, well-aired can. More recently, by reason of the efforts made with the hope of bettering milk supplies, attempts at central sterilization of cans have been more commonly employed.

This, while thoroughly sound in principle, opened up new factors and led to new difficulties not previously experienced. The plan of central sterilization works satisfactorily, provided it is possible to efficiently wash and sterilize and dry a can during the time period which the farmer is willing to wait for the cans after he has emptied them.

It goes without saying that there are substantially no cans that have an entirely smooth interior. The more frequently the cans are subjected to sterilizing and refrigerating processes, the more likely are the soldered seams to open up macro and microscopically and furnish lodging places for the retention of milk throughout many periods of use. One who has not applied a soldering iron to an apparently clean seam, would be surprised at the character of the odor arising therefrom. Moreover, the amounts of metal in various parts of the milk can are not uniform. In attempts at effective sterilization by the use of heat, it is obvious that the parts of the can containing the most metal require the longer time period of action on account of the increased amounts of heat taken up by the larger quantities of metal. There can be no special rules laid down as to the amount of time necessary for the sterilization of a can by heat without consideration of a number of other factors. It is sufficient to say that under the average conditions as they occur in creameries, thorough sterilization of milk cans before returning them to farmers rarely takes place, although reasonably efficient, obvious and bac-

terial cleanliness is usually accomplished.

There remains one factor of very great importance to be considered in this connection: a can thus cleaned if allowed to go to the farmer in a moist condition with the cover remaining on it to prevent access of dust and bacteria from the air, will not remain in such a satisfactory condition if the temperature of the surrounding atmosphere is sufficiently high to produce incubation of the remaining microorganisms in the moisture on the interior surface of the can. This is a factor of no mean importance. We have found cans on farms that were to the naked eye clean and yet in the wash water we have obtained not infrequently bacterial counts in the hundreds of millions to billions, the high count being unquestionably the result of incubation of the bacteria which had been left behind after reasonably efficient, obvious and bacterial cleaning.

In last summer's investigation, already referred to, these results were amplified and a very considerable number of cans were found to show very high bacterial counts. Milk containing less than 50,000 per cc., when added to such a can, will show exceedingly substantial increases in numbers of microorganisms. It therefore is unquestionable that incubation, taking place in the warm season of the year in the moist interior surfaces of the cans, and other milk-handling apparatus which have apparently been satisfactorily cleaned, is a large factor in high bacterial counts. One only needs to consider the possibility of

farmers holding cans for even several days without use and without cleaning before use during the summer season, to realize the opportunities for incubation offered by cans handled in such a manner. Moreover, such bacteria have passed through a preliminary cultivation in diluted milk and are prepared for a very rapid growth in the product.

We need not take into consideration here the fact that farmers frequently use cans for the holding of skim milk for the feeding of animals. When skim milk is returned from the creamery to the farmer, it may frequently happen that it is not all fed to pigs or otherwise used within a few hours and it is often the case that such cans will be inefficiently washed at the farm and subsequently used for the handling of fresh milk for the creamery.

The principles involved and the effects produced by incubation in milk cans are applicable wherever similar conditions of apparently satisfactory cleaning, with retention of moisture and opportunities for incubation, occur. High bacteria counts may be looked for in the product handled in such apparatus. This applies not only to the farmer's utensils, but also to the apparatus in creameries and in other establishments handling milk at average temperatures. Valves, milk pumps, corners of tanks, bearings of agitators are very likely locations for such incubation, and are common sources of high bacterial counts in pasteurized milk.

In the investigations of last summer, 767 samples were taken from indiscrim-

inately selected cans of milk brought by each farmer to nine creameries. Temperatures were taken of the contents of each can. The examinations of these samples showed the following results: 50 per cent. of the 767 samples of farmers' milk showed bacterial counts of 50,000 or less; approximately 80 per cent. of the samples showed bacterial counts of 200,000 or less; approximately 15 per cent. showed a bacterial count of from 200,000 to 1,500,000 and only about 5 per cent. contained counts over the standard for Grade B of 1,500,000. In the 5 per cent. showing over the million and a half it was rarely the case that the numbers were less than tens of millions.

CONDITION ON ARRIVAL IN CITY.

The important conclusion undoubtedly warranted by these results is that while a very large proportion of farmers delivered milk of reasonably low bacterial counts, a very small proportion delivered milk of such excessively high counts as to increase substantially the general average bacterial count of the milk from each creamery; that is, the high average was in almost every instance due to the use of a small number of cans of milk from a small number of farmers, which milks contained tens of millions of bacteria.

As temperatures of the milk from each can had been taken it was interesting to determine the relation of high temperatures of milk on receipt at the creamery to the bacterial count obtained. While at times extremely high temperatures were associated

with high bacterial counts, this was by no means true even on the average. Far more samples of milk of low counts were collected from cans of high temperature than high counts from similar cans. In other words, the temperature of the milk, as it is received at the creamery, is not by any means a safe index for the passage of judgment as to the probable bacterial count of the product contained therein.

It is easy to speculate as to the probable causes for these high bacterial counts, but time will not permit of their consideration. The important fact is that a very few farmers, and even a smaller number of cans of milk in the section of the country supplying milk to New York City, are responsible to the largest possible extent for the high bacterial counts which have occurred quite frequently during the summer season.

Tests were made of the milks after handling by the creameries and when in the cans ready for shipment to the city; likewise, tests were made after receipt in the city. Without attempting to go into details, it can be said that, with but one exception, the creamery conditions could not be held responsible for any high bacterial count observed in the milks ready for shipment to the city. Milks under observation in this investigation were shipped to the city under conditions of icing in transit of an average high standard and in all but one instance the average count of samples from the cans sampled in the city was somewhat higher than the average counts from the same cans before

starting on their journey. However, taking into consideration the variability associated with bacterial count on the same samples of milk, the discussion of which has already been conducted by Professor Conn, the difference between the average New York City counts and those on the products from the same cans in the creamery were not strongly significant of any substantial increase due to failure in icing during transportation.

Neither the individual nor the average scores of the farms from which the milk examined was derived are available, but the scores must have been well above the average of 68 for Grade B milk for the city of New York.

It is fortunate that there are available for consideration at this time the results of bacteriological investigations made during the present summer upon samples of milk coming to a city dairy plant, which is located in a section of the country where substantially no efforts for the betterment of the milk supply have been made in times past. The farmers supplying milk to this city plant are on the average of a low grade of intelligence and with very meagre or no ideas whatever of obvious, much less bacterial, cleanliness. The character of the milk coming to this plant is clearly indicated by the fact that during the months of May, June, July and August the average bacterial count on samples taken on 27 days of the raw milk as it was passing to the clarifier was 14,000,000, the lowest count being 2,600,000 and the highest 35,000,000. The average of several

counts on samples taken during a period of 30 days showed the lowest to be 1,100,000 and the highest at 33,000,000. The average of the samples from all of a group of 47 farms was approximately 7,000,000; the average scores of these farms was 34, the highest being 60, the lowest 18 and but two of them over 50. We have in this case, therefore, milk coming from a large number of nearby farms of the lowest type from the sanitary standpoint.

Milk from these 47 farms is brought direct by the farmer to the city plant over an average distance of 8 miles. The milk is all cooled before transportation but to what extent is not definitely known. It is all delivered within 20 hours of milking and generally twice in the 24 hours. The competent bacteriologist in charge of this city milk plant expressed the opinion that incubation of the milk could hardly be a prominent factor in the causation of the high bacterial counts.

We have available for comparison with the counts already given for farmers in the state of New York, the results of examinations of samples from 50 cans taken at random from the product of 15 farmers, as it was being delivered to the city plant. From these cans there were no samples showing less than 100,000 bacteria per cc., as compared with 50 per cent. of samples in the New York State investigations showing less than one half that number.

Ten per cent. of the samples contained 200,000 bacteria per cc., or under as compared with 80 per cent.

in the state of New York investigation. Fifty-four per cent. showed counts of 200,000 to 1,500,000 as compared with 15 per cent. in the New York State investigation.

Thirty per cent. gave counts of over 1,500,000 as compared with 5 per cent. for the New York State results, and of this 35 per cent., 19 per cent. was in the tens of millions class.

The results that have just been reported are probably fairly representative of the bacterial character of the milk supplies of the majority of communities before the days of efficient official or private supervision.

In the opinion of the bacteriologist who was kind enough to furnish me with the evidence here given, the high bacterial counts in the milks coming from these farmers are due on the average to lack of cleanliness on the farm. A study of the results of the samples from individual cans from the 15 dairies goes to show that all of the 10 per cent. of low counts came from two farms, one of which, while very poorly equipped, was under the direct operation of persons of very cleanly habits. In no case did any milk from this farm contain a million bacteria per cc. The average was well under 500,000. One might perhaps be warranted in classifying the farmers showing the high bacterial counts in the products under these

circumstances as purveyors of dirty milk, whereas, in the opinion of the writer it is altogether inappropriate to classify the New York State farmers showing the high bacterial counts already described as purveyors of dirty milk for, in fact, the milk was not dirty *per se*. The high bacterial counts almost invariably were due to the growth of undoubtedly normal numbers of bacteria which had originally gained access to the milk.

CONCLUSIONS.

In parts of the country where adequate field and laboratory supervision of milk supplies have been in operation for a number of years, high bacterial counts are most generally caused through inefficiently cleaned apparatus, and by the incubation of bacteria taking place either on the moist surfaces of cans or other utensils, or that taking place in the product itself due to inefficient refrigeration.

In locations where no supervision has been in operation and where the producers are naturally more or less slovenly, the rather uniform, high bacterial counts found in milk from such farmers may be more or less appropriately attributed to definite dirty conditions. This would be especially true of the instances where the milk can be shown to have been delivered promptly and with the application of a reasonable degree of refrigeration.

The result of the comparisons made between these two groups may be taken as a fair index of the excellent results that have been brought about through the persistent, intelligent application of the methods of official and private milk supervision which have been in operation in most of the large centers of population during the past decade.

BACTERIAL TESTING VERSUS DAIRY INSPECTION.

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This paper has especial interest for the laboratorician and dairy inspector, and general interest to everyone. Mr. Laboratorician, do you test for "number" or "kind?" Mr. Inspector, do you work in coöperation or in opposition to the laboratory? Doctor North is well suited to write on the milk question, and he discusses in a clear and convincing manner the many problems essential to the maintenance of the health standard of this industry.

WHAT do large numbers of bacteria in milk signify?

Here is a question that has staggered the intellect of the majority of milk bacteriologists and milk inspectors. A convention on milk rarely passes its first session without some Solon arising to remark that "it is not the number but the kind of bacteria" which is significant in milk. This comment is a classical and traditional objection raised regularly against the advocates of the use of "the bacterial count." And yet in the face of the admission that tests for "number" do not determine the "kind" the tests for number have grown in popularity.

Numbers of bacteria in milk if excessive may signify: (1) initial contamination in the dairy from the cows, or from the milkers, or from the barns, or from unclean utensils; (2) secondary contamination during milk handling and transportation, by exposure to accidental pollution, or to unclean milk apparatus or containers; (3) to the growth and multiplication of bacteria as a result of inefficient cooling and refrigeration, or an excessive length of time between production and consumption—often called the "age"

of milk. These things may be summarized by saying that large numbers of bacteria in milk indicate that it is "dirty" or "stale" or both "dirty and stale." This conclusion is based upon the abundant experimental evidence that where milk is clean and fresh it always without exception gives a bacterial count of small numbers. The public has a right to demand that milk should be clean and fresh and not dirty or stale. Health officers are justified in demanding that milk dealers deliver a product clean and fresh, and in using the bacterial test as an index of cleanliness and freshness, and in establishing bacterial standards as a basis for excellence with respect to cleanliness and freshness. The primary purpose of the bacterial testing of milk by the use of the bacterial count is to determine its sanitary character.

Dairy inspection has as its primary object the maintaining of sanitary equipment and methods of milk production and milk handling. The fundamental purpose of the inspection is to prevent the contamination of the milk and to see that it is properly cooled and refrigerated. Such contamina-

tion always means dirt and dust from cows, barns, employees, utensils, containers, etc. Such contaminations are so commonly associated with bacteria that their entrance into milk means the inoculation of milk with bacteria, as shown by an increase in total numbers corresponding with the degree of contamination with dirt. In the face of this well known fact it is amazing to hear some of the most prominent bacteriologists and sanitarians assert that "the numbers of bacteria are only one factor in milk sanitation, for we must also take into account the sanitary conditions of the dairy and the methods of milk handling." Certainly the only considerations worthy of the attention of the health officer and sanitarian are those that affect the milk itself, and there is no way in which the dairy or milk handling can affect or contaminate milk without such contamination being reflected in that most delicate of tests we call "the bacterial count." Experience in dairy inspection has clearly shown that where the bacterial count is consistently low, milk contaminations are regularly prevented and efficient refrigeration is practised; and, on the other hand, where bacterial counts are high, sanitary methods of prevention are neglected, contaminations take place, and efficient refrigeration is not carried out. The dairy inspector has behind and underneath all of his work the purpose of preventing the contaminations of milk with dirt and with bacteria which commonly accompany the dirt. To assert that dairy "equipment" and "methods" deserve special consideration on any

other grounds or for their own sakes is a strange philosophy, and loses sight of the intimate connection between them and the product itself. It is like the dog chasing his own tail. The inspector after all must go to the bacteriologist to learn his "results," and the bacteriologist must look to the inspector for his "causes."

Both the inspector and the bacteriologist must surrender when asked regarding the "kind" of bacteria. Their work in dairy sanitation must use the "number" as the indicator of results. The question of "kind," because of the physical obstacles in the way of any regular routine laboratory tests for pathogenic species of bacteria, must remain unanswered. The degree of risk from the bacteria of disease can be greatly diminished by sanitation. Milk with very small numbers of bacteria has received very slight contamination with dirt and a diminished risk from material infected by men or animals. Veterinary inspection of dairy cattle may reduce the risk of infection with the bacteria of cattle diseases. Medical inspection of dairy employees may reduce the risk of infection with the bacteria of human diseases. But neither the sanitary inspector, nor the veterinary inspector, nor the medical inspector, nor the bacteriologist is able to furnish the milk consumer with any definite answer to the question of the "kind" of bacteria in milk. In the face of the best work of these four classes of experts no test has been devised competent to determine in routine practice the "kind" of bacteria in market milk, or to protect

even the highest grades against occasional infection with the bacteria of disease from dairy cows or from dairy employees. There is one, and only one, method of positively settling the question of the kind of bacteria in milk, and that consists in the process of pasteurization, which, properly performed, can be depended upon to destroy all species of infectious bacteria transmissible by milk.

In spite of the opposition of the milk industry to its advent, both on the part of individuals and organizations, and in spite of the open opposition of some sanitarians, the laboratory for bacterial testing of milk by the bacterial count has increased in popularity, and seems to be with us to stay. Federal, state, and municipal laboratories are established for this purpose, and the only question remaining seems to be just what limitations should be placed on the functions of such laboratories, and on the conclusions drawn from their work.

The growth of the bacterial testing of milk has taken place in open competition with the well established system of dairy inspection. Previous to any widespread practice of bacterial testing it was well recognized that dairy sanitation should be controlled by a system of dairy inspection. It seemed on the face of it a simple proposition for municipalities to control the sanitary character of their milk supplies by suppressing and preventing contaminations through the activities of a force composed of one or more milk inspectors. Through the visits, regular or irregular, of the milk and dairy inspector supervision could be

exercised over dairy barns and the processes of milk handling, from the producer to the consumer, and it was believed that the conditions observed and maintained by the producer and dealer would be reflected in the character of the product as delivered to the consumer. As a consequence dairy inspection had become well established in the early history of the campaign for milk reform, and the inspector of milk sheds was looked on by municipalities as a public official secondary in importance only to the inspector of watersheds.

The laboratory for making bacterial tests of milk entered the field at first somewhat as an interloper, and, in most instances, under auspices which were independent of the milk inspection service. It is not more than fifteen years ago that the bacterial testing of milk by municipal laboratories developed to a point where it became a factor of any importance. Its growth was characterized at first by uncertainty as to its methods, numerous variations in method being noticeable as a result of local option on the part of the directors of laboratories in various cities. Variations in methods naturally led to inconsistencies in results, so that comparisons between tests in different cities and even tests of laboratories in the same city were incongruous. In addition to the uncertainty of method has been the uncertainty of the relationship which the bacterial results bore to the sanitary character of milk, and the uncertainty of the relationship which the bacterial laboratory bears to dairy inspection as a whole.

Dairy inspection itself, however, was in an uncertain position, and although established as a practice for many years, and at present firmly established, its exact relationship to the sanitary character of milk is still indefinable. While this uncertainty has been referred to by numerous authors, one of the clearest expositions appears in a Bulletin of the Virginia Polytechnic Institute published in September, 1911, entitled: "A Study of the Bacterial Count and Dairy Score Card in City Milk Inspection," by Brainerd and Mallory, in which the authors tabulate a series of tests on milk and a series of dairy inspections which show that there is no definite relationship between the character of the milk and the character of the dairy where the milk is produced. Among their conclusions they state: "The score card is defective when used as a measure of the sanitary properties of milk. . . . These experiments clearly show that it is possible to produce good milk under conditions which would give a score below any effective standard which might be established. . . . The chief difficulty of the score card is that as a measure of the sanitary properties of milk none of the points scored have a permanent value under all conditions, and it is questionable whether they have a definite value under any given set of conditions."

Numerous investigators have from time to time shown the possibility of producing sanitary milk in dairies where external conditions are extremely unsanitary. As a consequence, it is necessary to acknowledge at the

outset that the conditions which can be observed by the dairy inspector bear no definite relation to the sanitary character of the milk itself. The production of "Grade A Milk" for the New York City market in several thousand barns of the ordinary type by the rank and file of dairy farmers, such milk in most cases conforming with standards for bacteria of 25,000, and even 10,000, is a demonstration of this fact on a gigantic scale.

On the other hand, the testing of milk for bacteria by the laboratory has gradually developed methods which have become so well standardized that the inconsistent results at first complained of have been greatly reduced. The standard methods recommended by the Laboratory Section of the American Public Health Association can be depended upon to produce in duplicate samples, bacterial counts which will vary on the average not more than 25 per cent. In some good laboratories such results may not vary more than 10 per cent. Even a 25 per cent. variation is a degree of accuracy which is sufficient for practical purposes in testing between milks of different grades. For example, in the case of certified milk having a standard of 10,000 bacteria per cc., a 25 per cent. variation would mean the difference between 10,000 and 12,500 bacteria per cc., so that it would be easy for a laboratory making tests within such limits to distinguish milks varying in excellence within such limits as 10,000, 50,000, 100,000, 500,000 and 1,000,000 bacteria per cc.

One of the commonest faults alleged

against the testing laboratory for bacteria has been its inefficiency and inability to test the entire municipal milk supply without prohibitive expense. It is true that the principles which have been heretofore practised in research medical laboratories, in which expensive and refined equipment, and abundance of time for deliberation and study, and high salaried workers prevailed, have engendered the belief that bacterial testing could not be widely extended by health authorities or by the milk industry. The type of laboratory required, if it is to properly fulfill its function as an instrument in the hands of the health officer or dealer, must embody a large capacity for work at high speed and low cost both for equipment and operation. A comparison of the equipment, efficiency, and expense of municipal laboratories now in operation shows plainly not only remarkable variations in efficiency and economy but the need for standardization, not only of methods, but of the conduct of laboratory work as a whole.

Simplicity is the first element in efficiency. There are certain essentials of laboratory equipment and methods which may be separated from nonessentials. Without going into too much detail, it may be pointed out that culture media may be produced by the use of simple cooking utensils, and in large quantities, with the same expenditure of time that in some laboratories small quantities are produced with elaborate apparatus. The culture medium may be kept in flasks of 300 to 500 cc. capacity, rather than in test tubes, thus reducing greatly

the number of mouths to be cleaned and filled and plugged. Dilution bottles may be marked at the point required for 99 cc. or 9 cc. capacity, thus greatly saving the time required in measuring and filling. Pipettes of plain glass with only one mark at the 1 cc. point are all that are required for making milk dilutions. Petri dishes of the deep kind, rather than the shallow kind, facilitate speedy work. Incubators such as are used for the incubation of hens' eggs are cheap and very much more efficient in many instances than the elaborate and expensive incubators sold by laboratory supply houses. It is possible to write the specifications for the complete equipment of a milk testing laboratory capable of testing from 100 to 200 samples of milk daily at a cost of not more than \$500.00, and as little as \$200.00.

In the laboratory itself efficiency methods should begin with sample taking, using sample cases capable of carrying from fifty to one hundred tubes, and a sheaf of fifty to one hundred pipettes, suitably constructed to hold cracked ice sufficient to keep milk samples cool.

In the laboratory, plating tables should be high so that work can be done standing up, and tables should be long so that a large number of samples can be lined up for plating at one operation. Simple carpenter's horses with long boards will answer the purpose as well as expensive tables with stone or marble tops. Bottles and plates can be arranged in long rows systematically, and marked in series, and the work done consecutively by

two or more workers coöperating and following each other down the line making dilutions and pouring agar. Rapid counting of colonies can be facilitated by counting in groups of 5, 10, 15, 20, etc. By efficiency methods a first class worker, under pressure, can plate milk samples without any neglect of sanitary precautions at the rate of fifty samples per hour. One hundred samples per day is not too much to ask of one worker for both plating and counting, provided glassware and culture media are furnished by assistants.

The above statement is certain to be questioned, especially by many of the directors of municipal milk laboratories. In my personal inspection of the majority of milk laboratories in large American cities, the maximum number of samples tested by the individual worker in any laboratory was thirty samples per day, while the minimum was five samples per day. These numbers are in remarkable contrast with the number of samples handled in large commercial laboratories, and in laboratories established by the milk industry, where at least 50 samples constitute a day's work.

Regarding the type of laboratory worker required, the plating of milk itself is a mechanical process, requiring no special preliminary training. The making of dilutions, pouring of agar, and the counting of the plates are operations easily mastered by any bright boy or girl with a high school education after a training of about six weeks. Such young persons can be employed at salaries ranging from \$12 to \$25 per week, and many of

them are now so employed and working daily in many of the large milk testing laboratories in this country. Such workers, of course, cannot qualify as bacteriologists or as expert witnesses. But for the simple "plating" of milk samples for bacteria their work is reliable.

No one can make a study of the volume of work which is being handled in the efficient type of milk testing laboratory referred to, or of its cost, without being satisfied that at the present time the testing of milk for bacteria in such laboratories has been perfected to a degree which places the application of this method of control easily within the reach, not only of every state and municipality, but also within the reach of country villages. Such a laboratory is rapidly becoming an essential part of every well organized milk business.

It is only by a survey of the results of many thousands of tests in laboratories doing a large volume of work that the real significance of the bacterial testing of milk becomes apparent. A single test, or a small series of tests, fails to show the real strength of this method of milk control. When one contemplates series of tests carried through weeks, months, and years, drawn from the same sources, it becomes obvious even to the casual observer that the numbers of bacteria as shown by the bacterial count bear a very close relation to the care exercised by the milk producer and the milk dealer. At the shipping stations where so-called "Grade A Milk" is being produced for New York City and other markets the statistics which

have been compiled show plainly that whereas formerly the milk produced by large groups of farmers contained hundreds of thousands, and frequently millions of bacteria per cc., it now contains only a few thousand—often less than 10,000 bacteria per cc. The reduction in the bacteria corresponds closely with the change in the methods of sanitary care exercised by the producer.

In the same manner, it can be shown by a study of the statistics in the books of large milk laboratories that the refrigeration of milk regularly prevents the growth of bacteria, and that large numbers always result from lack of refrigeration.

Finally, the efficiency of the large machines used for pasteurizing milk can be quickly ascertained by testing milk before and after treatment for the numbers of bacteria which it may contain. Good pasteurizing machinery should destroy at least 99 per cent. of the bacteria commonly found in milk. In connection with such machinery the bacterial test is particularly useful, performing the function somewhat similar to the bacterial test as applied to plants for the filtration of water. Groups of samples, taken in series, of raw milk before treatment, of milk after heating, after holding, in a heated condition, after cooling, and after bottle filling, show clearly whether the operation of a pasteurizing machine is efficient, and if not at just what step in the process the operation is a failure.

Up to the present time the tendency has been to consider the milk testing laboratory as a law unto itself, and a

department by itself, and to consider dairy inspection, as conducted by the force of milk inspectors, as a law unto themselves, and a department by itself. The uncertainties of laboratory testing above referred to may have in the past justified separate organizations of this kind for the reason that any possibility of coöperation might well be postponed until the usefulness of each of these factors in milk control had been independently demonstrated.

I believe, however, that now we have arrived at a point in our knowledge of the utility of each of these factors of milk control which justifies the establishment of a more definite relationship between the two and a readjustment of their functions, not only in the interests of economy, but in the interests of efficiency.

The dairy inspector to whom a certain territory is assigned, which he must periodically cover without any knowledge on his part excepting the geographical location of the dairies which he is to visit, is like a man who goes about his work blindfolded. He does not know the character of the milk produced in the dairies he is to visit, and neither does he know until he arrives on the premises whether the dairy is sanitary or unsanitary. If he should devote one day to visiting ten dairy farms it is easily possible that eight of these may be in a good sanitary condition and only two in an unsanitary condition, and by night time it is perfectly obvious that much of the inspector's time has been wasted in visiting the eight sanitary dairies, and that only a portion of his time has been expended efficiently because

of the two unsanitary dairies which he visited. So I assert that a large portion of the time of milk and dairy inspectors is wasted in visiting premises which they discover to be in a good sanitary condition. On the other hand, the unsanitary dairies which require their inspection, and for the inspection of which their office is created, are not visited as often as they should be nor do they receive the benefits of dairy inspection which is intended for them because of the intervention of sanitary dairies, and of the waste of time on the part of the inspector in visiting dairies which need no inspection.

In addition to this, it is a fact that some dairies which appear to be in good sanitary condition are actually producing very foul and contaminated milk, but may be given a clean bill of health by the dairy inspector because of external appearances. Also, it is true that milk of the highest sanitary character is frequently being shipped from dairy barns which, perchance, the dairy farmer is renting from the owner, and which for this reason he cannot afford to renovate, but in which by practising the more important sanitary methods the farmer is regularly producing a most sanitary article. These premises the inspector condemns because of their unfavorable external appearances. As a result, an inspection service so conducted may be called a blindfold service, and an aimless service full of inconsistencies and full of inefficiency.

The work of the inspector can be made intelligent and efficient only by the bacterial testing laboratory. The

foundation of any inspection system should be the laboratory service. The testing of the milk should precede the inspection of the dairy. The testing of milk samples for bacteria at once divides the product into two classes, sanitary and unsanitary. The source of supply being known, the inspector's attention can at once be directed to the places from which unsanitary milk is being shipped. Through the intelligent tabulation of laboratory tests the dairy inspector can ascertain, not only the occasional irregularities and variations in individual milk supplies, but the general character of all milk supplies.

This work should begin on the city end of the line. Samples of milk taken from bottles and cans as sold on the market should be tested for numbers of bacteria. When such numbers are high in the case of pasteurized milk the inspection service should send an inspector to examine the operation of the pasteurizing plant. In such cases common defects are the use of too low temperature for pasteurization, or imperfect cleaning of the pasteurizing or bottling machine, or dirty bottles. In the case of high counts in raw milk, the inspector must be directed to examine into conditions of the raw material as it is received from the country.

Next to the examination of the final packages for sale on the market, the main point of attack should be the "receiving tank" or "dump tank" in the bottling and pasteurizing station in the city. This is the strategic point, not only for detecting the general character of the mixed milk of

an individual dealer, but also the point at which samples can be taken from the cans received from all of the various dairy districts from which this supply is secured. Bacterial tests taken at this point will indicate by the high counts which of the several sources of supply are shipping unsanitary milk, and which, therefore, require the attention of the inspection service.

In like manner, the laboratory service should invade the country, and take samples of milk in the country shipping stations from the cans of individual producers, and by the laboratory reports direct the inspection service to the location of dairies producing unsanitary milk.

In short, the laboratory test should precede the dairy inspection along the line from city to country. In this way the laboratory can locate unsanitary milk, and direct the inspection service into the channels where such service is needed most. This would mean not only a great saving in the time of the dairy inspector, now largely wasted in inspecting sources of sanitary milk, but a great increase in efficiency because the inspection is concentrated on the sources of unsanitary milk.

In place of a territorial distribution of inspectors, such as is often provided by large municipalities, and a periodic inspection of dairies irrespective of the character of the milk produced, the consolidation of the laboratory service with the inspection service transforms the inspection force into a flying squadron, quickly concentrated if need be upon such portions of the municipal supply as the laboratory discovers is

most unsanitary. Through such laboratory coöperation the inspection force can carry out "raids" on the entire business of the individual dealer, covering both the city and country end of the business, for the quick location of unsanitary milk. From such raids the honest dealer would have nothing to fear, but they would constitute a most potent influence in controlling dealers who are careless or unscrupulous.

Such a scheme of coöperation between the bacterial laboratory service and the inspection service means a change in form of organization, which would centralize the authority of both services in one office with a single head. Both the laboratory work and the inspection work should be directed by this single head. From such a head a comprehensive plan of campaign can be formed, both for the laboratory tests, and the dairy inspections, for the control of the entire municipal milk supply with the greatest economy and efficiency.

Up to date there has been an undercurrent of competition, amounting almost to an antagonism, between dairy inspection and bacterial testing. This "irrepressible conflict" will be terminated by the form of coöperation above suggested. The laboratory function is to examine results, and to locate unsanitary milk. The inspector's function is to ascertain the causes, and to apply remedies. Each has a distinct and a most useful function to perform, which can be increased in value more than 100 per cent. through intelligent coöperation.

Widespread bacterial testing of milk

through the establishment of efficient milk testing laboratories will constantly furnish milk inspectors with information as to the sanitary or unsanitary condition of their entire municipal milk supply. Such a birds-eye view of the supply can only be obtained by a large volume of bacterial testing, made possible by efficient laboratory methods. Equipped with such information, dairy inspection acquires a new significance and an added importance. The concentration of the inspection service on the sources of unsanitary milk brings speedy and remarkable results, as shown by the reduction of the bacterial counts, and the improved sanitary character of the milk.

In forming plans for the expenditure of the annual appropriation for milk control the milk dealer as well as the health officer should bear in mind that one laboratory worker can test the milk of fifty dairy farms for bacteria while one dairy inspector is inspecting five dairy farms, and that therefore one dollar spent in laboratory testing covers as much territory as ten dollars spent in dairy inspection. The laboratory test should come first and make the diagnosis; the dairy inspector should come second and apply the remedy. These principles result in the greatest economy and efficiency, whether control is being exercised by the milk dealer or by the health officer.



A HEALTH HANDICAP.

A board of health that does not control the registration of vital statistics within its jurisdiction is seriously handicapped in its efforts to render the best health service. The importance of having births, marriages and deaths reported to the health authorities is now greater than ever before. The growth of work for the prevention of infant mortality makes the reporting of births to the health authorities having such work in charge imperative.

The legislature provided for the collection and tabulation of vital statistics before many boards of health were in existence. Later, when the State Board of Health was created, the registration of such statistics for the state was taken from the office of the Secretary of State and given to the State Board of Health. In many communities the local registration is still in the hands of officials other than health officials. There is need of legislation to clear up this situation and place the registration of vital statistics in the hands of boards of health in all communities.

With reference to the registration of births the present situation is anomalous inasmuch as the

law requires local boards of health to enforce the birth registration law but does not provide the means whereby boards of health can know whether or not births are reported in districts where reports are made to some other authority. In view of the great interest now being manifested in baby welfare and the prevention of infant mortality, there should be no delay in adjusting the method of birth registration. Unless boards of health receive reports of births they cannot utilize their nurses in this work to the best advantage and therefore the best results cannot be secured.

The Bureau of the Census at Washington is establishing a registration area for births. In order to be admitted to this area a state must enforce its birth registration laws and actually secure the registration of at least 90 per cent. of the births. Under present conditions it is practically impossible for local boards of health in many communities to obey the mandates of the law in securing such registration because the births are not reported to the board of health.—*Public Health News*, New Jersey State Department of Health.

STUDIES ON THE CLASSIFICATION OF THE COLON-TYPHOID GROUP.

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SINCE the studies of Smith in 1905 in an attempt to differentiate the lactose-fermenting organisms by the use of saccharose and gelatin, there have been proposed many systems of classification based upon the ability of the organisms to cause the fermentation of other substances. With the use of an increasing number of glucosides, sugars, alcohols and aldehydes, in addition to the other tests commonly applied, there have been described a large number of types, while a still larger number seem possible.

In 1905 MacConkey suggested a further division of these two groups, established by the use of saccharose, according to their ability to ferment dulcete. Later he proposed a further subdivision based upon the use of additional sugars and other tests.

In 1911 Jackson, following the lead of MacConkey, separated this group into sixteen types.

In 1912 Howe, working with 540 strains of lactose-fermenting, non-liquefying organisms, concluded that motility, quantity of gas formed and fermentation of mannite, dulcete and starch show but little correlation with other properties. He confirmed the basic classification introduced by Smith, and claims that dextrose, lactose, saccharose and raffinose constitute a true "metabolic gradient."

Kligler, working with 80 organisms

from the collection of the American Museum of Natural History, used dextrose, lactose, saccharose, salicin, glycerin and dulcete, with the aim of correlating the reactions obtained by these substances with gelatin, indol and the Voges and Proskauer reaction.

Rogers, Clark and Davis have made a thorough study of the amounts of carbon dioxide and hydrogen produced by the organisms of the colon group, eliminating the many sources of error which have heretofore so vitiated the accuracy of the determination of these gases.

During the past three years we have isolated about 5,000 gas-producing organisms from the water supply of Baltimore, and subjected them to examination in various media in an effort to discover if possible some combination of fermentation tests that would furnish a truer biological classification of the members of the colon-typhoid group.

In the beginning we followed the procedure of the Standard Methods of the American Public Health Association, using lactose, dulcete and saccharose, with gelatin incubated for two weeks at first and later for thirty days. The results are shown in Table I. Of those organisms classified according to the fermentation reactions alone as *B. communior*, 13 per cent. liquefied gelatin in 30 days; of those organisms classified as *B.*

TABLE 1.

	Gas in dextrose.							
	Gas in lactose.				No gas in lactose.			
	Gas in sucrose.		No gas in sucrose.		Gas in sucrose.		No gas in sucrose.	
	Gas in dulcite.	No gas in dulcite.	Gas in dulcite.	No gas in dulcite.	Gas in dulcite.	No gas in dulcite.	Gas in dulcite.	No gas in dulcite.
Gelatin not liquefied in two weeks.	91	162	98	97	8	43	5	—
Gelatin liquefied in two weeks.	5	7	5	0	3	7	0	—
Per cent. liquefied.	5	4	5	0	30	14	0	—
Gelatin not liquefied in four weeks.	367	333	236	323	0	16	3	69
Gelatin liquefied in four weeks.	68	295	3	27	1	82	1	24
Per cent. liquefied.	13	47	—	9	—	83	—	26

aërogenes, 47 per cent. liquefied gelatin; of those classified as *B. communis*, 1 per cent. liquefied gelatin; and of those classified as *B. acidi-lactici*, 9 per cent. liquefied this medium. When the gelatin cultures were incubated for two weeks there were only about one tenth as many liquefactions with organisms isolated from the same source.

Not being satisfied to consider all of the saccharose-positive dulcite-negative organisms which liquefied gelatin as a variety of *B. aërogenes*, we continued the use of lactose, saccharose and dulcite, with the addition of glycerin and raffinose, and made tests for motility, indol and Voges and Proskauer's reaction. All motility tests were made on 6 to 18 hours cultures in beef-infusion bouillon, and only definite motility was accepted as positive, all non-motile organisms being examined again after one or more rejuvenations. The gelatin cultures were incubated for six weeks, it having been noticed that a certain type of

organism (a form of *B. cloacæ*) did not cause any liquefaction until the fifth or sixth week. The sugar media were made from meat-infusion broth, inoculated to remove inosite, and Merck's chemicals were used for the fermentative substances.

These results are shown in Table 2. None of the motile organisms which fermented lactose, saccharose and glycerin (*B. communior*) liquefied gelatin nor produced a positive V. P. reaction, but nearly all produced indol. On the other hand, 96 per cent. of the motile organisms which fermented lactose and saccharose but not glycerin (*B. cloacæ*) liquefied gelatin; 85 per cent. produced indol and 50 per cent. produced a positive V. P. reaction. Eighty-two per cent. of the glycerin-positive organisms (*B. communior*) and 26 per cent. of the glycerin-negative organisms (*B. cloacæ*) fermented dulcite. Twenty-five per cent. of the dulcite-positive and 68 per cent. of the dulcite-negative organisms liquefied gelatin. Practically none of the lac-

TABLE 2.

			Gas in lactose.															
			Gas in sucrose.								No gas in sucrose.							
			Gas in glycerin.				No gas in glycerin.				Gas in glycerin.				No gas in glycerin.			
			Gas in dulcite.		No gas in dulcite.		Gas in dulcite.		No gas in dulcite.		Gas in dulcite.		No gas in dulcite.		Gas in dulcite.		No gas in dulcite.	
			+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Motile	Gel. not liq.	Indol	38	1	9	2	0	0	4	0	16	5	12	1	0	0	0	4
		V. P.	0	39	0	11	0	0	1	3	0	21	0	13	0	0	0	4
	Gel. liq.	Indol	0	0	0	0	13	5	68	12	2	0	0	0	0	0	0	0
		V. P.	0	0	0	0	7	11	40	40	0	2	0	0	0	0	0	0
	Raffinose		29	1	9	5	10	6	25	5	5	14	2	10	0	0	0	2
Non-motile	Gel. not liq.	Indol	7	0	17	1	0	0	0	0	8	0	0	0	0	0	0	0
		V. P.	5	2	16	2	0	0	0	0	0	8	0	0	0	0	0	0
	Gel. liq.	Indol	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
		V. P.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Raffinose		5	0	14	0	0	0	0	0	0	0	0	0	0	0	0	0

tose-positive, saccharose-negative organisms (*B. communis*) liquefied gelatin, and 90 per cent. of these organisms fermented glycerin, while only 58 per cent. fermented dulcite.

Seventy-six per cent. of the non-motile organisms fermented saccharose and all of these saccharose-positive organisms fermented glycerin, while 21 per cent. fermented dulcite also. Practically all of them produced indol and a positive V. P. reaction. All of the saccharose-negative organisms produced indol but none produced a positive V. P. reaction, so that they probably are the *B. duodenale* of Ford or the so-called *B. acidi-lactici*, the latter of which is variously stated as fermenting and as not fermenting dulcite. All of them fermented dulcite and glycerin.

These results would seem to show that glycerin is of considerable value in separating the liquefying from the non-liquefying organisms. This is also the opinion of Kligler, who found glycerin of value in differentiating the cloacæ and *aërogenes* bacilli. Rogers, Clark and Davis state that glycerin is fermented with difficulty by most of the members of the colon group. While this may be the case to some extent with *B. communis*, we have found that this substance is readily attacked by *B. communior* and *B. aërogenes*.

Kligler found that on subdividing the saccharose groups, on the basis of dulcite and salicin fermentation, respectively, that the saccharose-salicin groups gave better correlation with indol production, V. P. reaction and gelatin liquefaction than the saccha-

rose-dulcitate groups. Rogers, Clark and Davis state that one half of 26 organisms classified as *B. communis* fermented adonite and that only about 25 per cent. of the organisms classified as *B. acidi-lactici* fermented it, while none of 16 organisms classified as *B. communis* were capable of fermenting this substance. According to Muir and Ritchie, *B. aërogenes* and *B. acidi-lactici* ferment adonite, while *B. communis* and *B. cloacæ* do not. Eyre in his text-book on Bacteriological Technique, gives all of these organisms excepting *B. acidi-lactici* as fermenting dextrin and all but *B. aërogenes* and *B. acidi-lactici* as fermenting glycerin. Practically all of our cultures fermented dextrin on rejuvenation if not on the first inoculation.

Classifying the cultures which we have tested by the use of dextrose, lactose, saccharose, dulcitate, adonite

and glycerin in the order named, we secure the numbers of various subtypes as shown in Table 3. Unfortunately tests for motility were not made during this part of the work; but, nevertheless, the results afford sufficient information to justify their consideration. The value of glycerin in separating *B. cloacæ* from *B. communior* and *B. aërogenes* is again shown, since less than one per cent. of the glycerin-positive organisms liquefied gelatin, whereas 90 per cent. of the glycerin-negative organisms did so. In this series about one half of the lactose-sucrose-positive and one fourth of the lactose-positive, sucrose-negative organisms fermented dulcitate. Adonite showed similar results, while salicin showed a higher degree of fermentation. If we consider the sucrose-salicin-positive organisms as *B. aërogenes* and the sucrose-positive,

TABLE 3.

	Gas in lactose.								No gas in lactose.							
	Gas in sucrose.								Gas in sucrose.							
	Gas in glycerin.				No gas in glycerin.				Gas in glycerin.				No gas in glycerin.			
	Gel. not liq.		Gel. liq.		Gel. not liq.		Gel. liq.		Gel. not liq.		Gel. liq.		Gel. not liq.		Gel. liq.	
	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Dulcitate.....	74	83	0	1	14	21	31	133	0	0	0	118	0	0	0	3
Adonite.....	79	78	0	1	2	23	7	167	0	0	0	118	0	0	0	3
Salicin.....	140	17	1	0	17	8	173	1	0	0	7	111	0	0	0	3
	No gas in sucrose.								No gas in sucrose.							
	No gas in sucrose.								No gas in sucrose.							
	No gas in sucrose.								No gas in sucrose.							
	No gas in sucrose.								No gas in sucrose.							
	No gas in sucrose.								No gas in sucrose.							
Dulcitate.....	26	16	0	2	6	50	1	3	0	0	0	51	0	0	0	2
Adonite.....	21	51	1	1	1	55	2	2	0	0	0	51	0	0	0	2
Salicin.....	27	45	2	0	48	8	4	0	0	0	3	48	0	0	2	0

salicin-negative organisms as *B. communior*, we find 331 of the former type and only 6 *B. communior*, whereas, in the previous test and in a later series with cultures from the same sources, where motility tests were made, we found eight or nine times as many *B. communior* as *B. aërogenes*.

In a fourth series of tests, the results of which are shown in Table 4, motilities were again run. Tests were also made for pigment formation, and all but one of the proteus types produced pigment, whereas very few of the *B.*

cloacæ did so. The results are substantially the same as those of the second series shown in Table 2.

Summarizing the above results we arrive at the following conclusions:

Glycerin is of value in separating *B. cloacæ* from *B. communior* and *B. aërogenes*, but it is fermented by both of the latter types, and *B. communis* isolated from water frequently fail to ferment it.*

Dulcitol and adonitol are of little value in separating *B. cloacæ* from *B. aërogenes* and *B. communior*, and

TABLE 4.

			Gas in lactose.								No gas in lactose.							
			Gas in sucrose.				No gas in sucrose.				Gas in sucrose.				No gas in sucrose.			
			Gas in glycerin.		No gas in glycerin.		Gas in glycerin.		No gas in glycerin.		Gas in glycerin.		No gas in glycerin.		Gas in glycerin.		No gas in glycerin.	
			+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
Motile	Voges and Proskauer React.		+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-
	Gelatin not liquefied	No pigment	10	28	3	0	13	36	22	4	0	2	0	0	18	9	0	4
		Pigment	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Gelatin liquefied	No pigment	2	4	50	15	0	1	6	1	0	0	0	0	0	1	0	0
		Pigment	5	4	3	7	1	3	3	5	70	76	2	3	5	4	1	2
Non-motile	Gelatin not liquefied (No pigment)	Dulcitol +	1	4														
		Dulcitol -	0	8														
		Adonitol +	4	7														
		Adonitol -	0	2														
		Salicin +	4	8														
		Salicin -	0	0														
		Starch +	6	6														
		Starch -	0	1														
	Gelatin liquefied	No pigment								1								
		Pigment									1							

* In a study now in progress, where we have isolated, up to this time, about 40 cultures of lactose-fermenting organisms from 13 specimens of human feces, all of the cultures ferment glycerin.

References: Smith, *Centrabl. f. Bakteriöl.*, v. 18, p. 494; MacConkey, *Jrnl. Hyg.*, v. 5, p. 333; v. 9, p. 86; Jackson, *Jrnl. Infect. Dis.*, v. 8, p. 241; *Jrnl. Am. Pub. H. Assn.*, n. s., v. 1, p. 930; Howe, *Science*, v. 25, p. 225; Ford, Rockefeller Inst., v. 2; Kligler, *Jrnl. Infect. Dis.*, v. 15, No. 1; Rogers, Clark and Davis, *Jrnl. Infect. Dis.*, v. 15, No. 3; Muir and Ritchie, MacMillan, 1913; Eyre, Saunders, 1913.

a majority of *B. communis* isolated from water fail to ferment these substances.

Salicin is frequently fermented by all of the lactose-positive organisms.

Raffinose is frequently fermented and dextrin usually fermented by all of the lactose-positive organisms.

The principal necessity at the present time seems to be the discovery of

some simple test that will conclusively differentiate the colon and *aërogenes* bacilli. Motility examination, if properly conducted, can be depended upon for this purpose, but its use as a routine test is not in favor. Voges and Proskauer's reaction is promising, and it seems reasonable to suppose that some one of the starches may furnish the desired fermentative substance.



HEALTH SUPERVISION IN SMALL TOWN SCHOOLS.

School inspection is still in an incipient or imperfect stage and in small towns has hardly made much progress. Creighton Barker, New Milford, Conn. (*Journal A. M. A.*, April 15, 1916), calls attention to this point. The reasons for the nonattention in small towns and rural districts are many, chief of them being a somewhat narrowed administrative perspective and false economy. It also may be said that, owing to the usually superior housing, sanitary and other environmental conditions, it does not seem so imperative. There are more children, however, in rural districts than in the cities, as he shows by published statistics and nearly 18,000,000 children in schools are neglected as far as sanitary conditions are concerned. The term "medical inspection" is misleading; "health supervision" is a better term. Doctor Barker does not consider a school nurse an adequately trained person for inspector, but in connection with an energetic and competent physician free from political interference of any kind, a well trained nurse on duty and permanently employed is an ideal combination. Provisions for treatment should also be provided for. The laws of some states specify that examinations of female children, unless made by a woman physician, should be in the presence of the parents. While this at first appears like a stumbling

block, it brings many mothers to the school, most of whom are impressed with the value of the supervision. The public press is a useful factor if properly used and the circulation of a health monthly or health pamphlet also spreads the good work and publicity generally is beneficial. In the district schools in the country complete school inspection is not so practicable. They are frequently remote from the centers and have but few pupils. Instituting a health day has been found to reach this problem with an encouraging degree of success. A Saturday in the early fall or spring is chosen, the farmers come in and bring in the children, the health supervision is explained and the examinations made. In one community health day combined with the meeting of the agriculture extension institute, the farmers quickly saw the parallel between raising better crops and better children and two highly constructive measures were mutually benefited. The question of expense is usually a formidable one. State legislation is required but in the small town an expense of \$2 per child should, with economy, be sufficient. When one considers, however, the recent appropriation by a large Eastern state of \$150,000 for health and \$750,000 for the benefit of hunters and fishermen it would seem that the children's welfare is undervalued.

CONFIRMATORY TESTS FOR *B. COLI* IN ROUTINE WATER EXAMINATIONS.

W. H. FROST, M. D.,

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Read before the Laboratory Section, American Public Health Association, Rochester, N. Y., September 7, 1915

THE assumption that all bacteria which ferment lactose with the formation of gas are of intestinal origin is admittedly open to question and subject to at least hypothetical exceptions; nevertheless it constitutes a satisfactory basis for interpreting the results of bacteriological water-examinations.

Starting with this assumption, the formation of gas in a lactose-medium fermentation tube, under the usual conditions of water-examination, is sufficient proof that living bacteria from the intestinal tract of man or some of the lower animals are present in the water. However, since the lactose-fermenting bacteria themselves are considered non-pathogenic, their presence is significant only as indicating the probability that living pathogenic varieties of like origin may be present. Were it practicable to distinguish between the intestinal bacteria of man and those of the lower animals, much more definite significance would attach to the presence of those which are characteristic of human discharges, since the pathogenic bacteria of real importance in water-supplies are derived from human discharges. But, as such differentiation is not practicable, the next most important distinction to be made between the numerous varieties of lactose-fermenting bacteria is in respect to their viability outside of the animal body, those varieties of the most limited viability being obviously of the most dangerous significance. Upon this basis the lactose-fermenting bacteria may be divided primarily into two well-defined groups, the spore-forming and the non-spore-forming varieties.

So far as is known all the aerobic bacteria capable of fermenting lactose with the formation of gas belong to the non-spore-forming group, and may be considered collectively as the "*B. coli* group." On the other hand, so far as is known, the obligate anaerobes which ferment

lactose with gas-formation are all spore-formers, hence more resistant than the *B. coli* group and not of the same significance as danger signals.

Because the aerobic or *B. coli* group are by far the more numerous in most waters, the formation of gas in a lactose medium fermentation tube has come to be considered as "presumptive" evidence of the presence of *B. coli*, and to be interpreted as signifying the presence of non-spore-forming intestinal bacteria, disregarding the possibility that the gas-formation may be due to spore-forming anaerobes. This "presumptive" test, which is commended by its simplicity, may be considered satisfactory provided the error in the "presumption" is insignificant in extent or, if more considerable, is constant or easily measurable.

The following statistical data relative to factors of variation in the presumptive test for *B. coli* are compiled from the records of approximately 19,000 bacteriological examinations made during the year 1914 in connection with a study of the pollution of the Ohio River.*

In these studies it has been our practice to confirm all significant presumptive tests to the extent of demonstrating the presence or absence of aerobic organisms fermenting lactose with gas-formation.

The procedure in making *B. coli* tests has been uniformly as follows:

Three portions of each sample are planted in lactose bouillon fermentation-tubes, which are incubated 48 hours at 37 degrees C., gas-formation being recorded at 24 and at 48 hours. After 48 hours' incubation, plates on Endo's medium are made from the smallest portion of each sample showing gas formation, however slight. If typical lactose-splitting (red) colonies develop on these plates within 24 hours the result is considered positive for *B. coli*. As a check upon the accuracy of this provisional diagnosis, a

* The data here cited will be presented in more detail and discussed more fully in a paper now in course of preparation.

TABLE I.

SUMMARY OF RESULTS AS TO DEMONSTRATION OF B. COLI IN CONFIRMING PRESUMPTIVE TESTS IN LACTOSE BOUILLON: TESTS CLASSIFIED ACCORDING TO SOURCE OF SAMPLES AND ACTIVITY OF GAS-FORMATION.

Gas-formation in presumptive test.*		Samples from river direct.			Samples from municipal supplies.		
		No. of tubes showing gas as indicated.	Per cent. which these are of total.	Per cent. showing presence of B. coli.	No. of tubes showing gas as indicated.	Per cent. which these are of total.	Per cent. showing presence of B. coli.
24 hrs.	48 hrs.						
+	+	9,914	61.4	97.8	208	32.2	90.8
±	+	2,163	13.4	96.7	87	13.4	82.8
±	±	139	0.8	68.3	39	6.0	69.2
-	+	2,755	17.1	91.5	128	19.8	78.1
-	±	1,179	7.3	62.2	185	28.6	58.6
Total...		16,150	100.0	93.8	647	100.0	73.8

* + signifies gas occupying more than 10 per cent. of closed arm.

± signifies gas occupying less than 10 per cent. of closed arm.

- signifies no gas.

typical colony is selected from every tenth positive plate for further identification. Of 1,852 colonies so selected; 96 per cent. have been identified as B. coli within the definition above given.

Where no typical colonies develop within 24 hours upon plates made from fermentation-tubes showing gas, further effort is made to recover B. coli as follows:

(1) Unless the plates are sterile, one or more colonies are selected and transferred to lactose bouillon fermentation-tubes. The formation of gas in these tubes, inoculated with aerobic plate colonies, demonstrates the presence of aerobic gas-formers, that is, B. coli.

(2) Plates are again made from the original fermentation-tube.

(3) A transplant is made from the original fermentation-tube directly to another lactose bouillon fermentation tube. If steps "1" and "2" have both failed to recover B. coli, plates are now made from this transplanted culture.

(4) At the same time a transfer is made from this tube directly to a third fermentation tube to carry over any anaerobic organisms which may be present. If all the above procedures

fail to recover B. coli, and gas is still formed in this fermentation tube under anaerobic conditions, the inference is that gas-formation in the preliminary test was due to an obligate anaerobe.

If the whole procedure fails to demonstrate either aerobic or anaerobic lactose-fermenting bacteria it is concluded that the gas-forming organism originally present in the preliminary test tube has been overgrown or lost in the manipulations.

By this procedure we are able to recover B. coli in about two thirds of the cases where the first plates appear negative or doubtful; also, where the final result is negative for B. coli, we are able in a certain proportion of cases to demonstrate the presence of obligate anaerobic gas-formers.

The following tables show the results obtained in attempting thus to confirm a large number of positive presumptive tests, using both lactose bouillon and lactose bile.

The samples examined are divided into two contrasting groups, the first including all samples from the Ohio River and its tributaries, the second only samples from the municipal water-

supplies of Cincinnati and the adjacent cities of Covington and Newport, Kentucky. The river samples for the most part show high pollution, B. coli being usually demonstrable in amounts from one tenth to one ten thousandth cubic centimeter. The municipal supplies are all taken from the Ohio River. The Cincinnati supply is purified by short sedimentation, mechanical filtration and treatment with liquid chlorine; the Newport supply, after treatment with small amounts of coagulant and hypochlorite, is stored about twenty days; and the Covington supply is stored about thirty days, without other treatment. The Cincinnati supply shows a bacterial removal of over 99 per cent., while the other two supplies show well over 90 per cent. average removal.

Considering, for the present, only the examinations of river water, the percentage of presumptive tests confirmed varies in proportion to the activity of gas formation, the percentage of positive results being higher when gas-formation begins within twenty-four hours, and where the total amount formed within 48 hours is more

than 5 or 10 per cent. It will be noted, too, that in most of these samples gas-formation is active. Altogether 92 per cent. show more than 10 per cent. gas at the end of 48 hours, and 76 per cent. show gas-formation beginning within 24 hours.

Comparing the results obtained in the examination of samples from the three municipal supplies, it is noted that for corresponding activity of gas-formation, the percentage of confirmed results is consistently lower; also that gas-formation is generally less active than in tubes inoculated with the raw river water. Only 65 per cent. of these samples show more than 10 per cent. gas in 48 hours, as against 92 per cent. of the river water samples; and only 52 per cent. show gas in 24 hours, as against 76 per cent. of the raw water samples.

In Table II are shown the results obtained, using lactose bile as the preliminary fermentation medium, in a smaller but otherwise comparable series of tests.

In general the results are similar to those shown in the first table, except that the percentage of confirmed results shows a less marked

TABLE II.

SUMMARY OF RESULTS AS TO DEMONSTRATION OF B. COLI IN CONFIRMING PRESUMPTIVE TESTS IN LACTOSE BILE: TESTS CLASSIFIED ACCORDING TO SOURCE OF SAMPLES AND ACTIVITY OF GAS-FORMATION.

Gas-formation in presumptive test.*		Samples from river direct.			Samples from municipal supplies.		
		No. of tubes showing gas as indicated.	Per cent. which these are of total.	Per cent. showing presence of B. coli.	No. of tubes showing gas as indicated.	Per cent. which these are of total.	Per cent. showing presence of B. coli.
24 hrs.	48 hrs.						
+	+	576	28.6	98.8	105	40.4	60.9
±	+	511	25.3	99.4	35	13.5	60.0
±	±	22	1.1	86.4	15	5.7	33.3
-	+	660	32.7	97.9	58	22.3	67.2
-	±	247	12.3	89.5	47	18.1	42.6
Total...		2,016	100.0	97.37	260	100.0	57.3

* + signifies gas occupying more than 10 per cent. of closed arm.

± signifies gas occupying less than 10 per cent. of closed arm.

- signifies no gas.

relation to the amount and time of gas-formation, which is more often delayed until the second day. In the series of river water tests the percentage of confirmed results is higher than with lactose bouillon, while in the tests of the municipal supplies the percentage is much lower, only 57 per cent. As applied to the river water the presumptive test in lactose bile is more specific and as applied to the treated waters less specific than in lactose bouillon. A comparison of lactose bile and lactose bouillon is, however, beyond the scope of this paper, except to show that the presumptive test is subject to similar variations in both media.

The larger proportion of unconfirmed results from positive presumptive tests in the examination of municipal supplies may be attributed, in part, to enfeeblement of the colon bacilli present in these waters, with attenuation of their lactose-fermenting properties; in part to the fact that in the treated waters the proportion of *anaërobic* gas-formers is larger than in the river water.

In fresh sewage the ratio of anaërobic lactose-fermenting bacteria to *B. coli* is small, probably less than 1 to 100. But the death-rate of *B. coli* in water is higher than that of the spore-forming anaërobics, hence as bacterial purification proceeds, the ratio of the anaërobics to *B. coli* increases, until, quite possibly, the former may even be in excess.

Analysis of the negative results from positive presumptive tests in the three groups of samples cited below illustrates such a progressive increase in the ratio of anaërobic gas-formers to *B. coli* and shows that the error in the presumptive test due to this cause is greater in the examination of treated than of raw water.

From the above-cited results it may be concluded that the so-called "presumptive test" for *B. coli*, whether in lactose bile or lactose bouillon, is subject to considerable variations in its specificity as indicating the demonstrable presence of *B. coli*.

Confirmation of the presumptive test, at least to the extent of demonstrating aerobic lactose-fermenting bacteria, seems justified, therefore, as adding materially to the significance of the

TABLE III.

NUMBER AND PER CENT. OF POSITIVE PRESUMPTIVE TESTS SHOWING ABSENCE OF *B. COLI*, PRESENCE OF OBLIGATE ANAEROBIC LACTOSE-FERMENTING BACTERIA.

Source of samples.	Total number of fermentation tubes showing gas, and plated out for confirmation.	Number and per cent. of these tubes showing <i>B. coli</i> absent, gas-forming anaërobics present.	
		Number.	Per cent.
Ohio River below Cincinnati: grossly polluted with fresh sewage	2,920	38	1.3
Ohio River above Cincinnati: sewage pollution from points over 100 miles upstream . .	560	18	3.2
Cincinnati, Covington and Newport public water supplies	647	84	13.
Cincinnati, Covington and Newport public water supplies, using lactose bile	260	37	14.

results and as affording the only uniform basis upon which to compare waters of different character and history. Careful confirmation of the presumptive test is especially important in the examination of treated waters, where the error in the presumptive test is greatest.

It may be added, however, that in the confirmatory procedure, it is necessary to make a careful and conscientious effort to demonstrate *B. coli*, even when plating upon a differential lactose medium fails to show characteristic colonies; otherwise a significant error will be introduced in this step.

REPORT OF THE COMMITTEE ON MEDICAL INSPECTION OF SCHOOLS.

WM. H. PETERS, M. D.,

Chief Medical Inspector, Cincinnati, Ohio, Chairman.

Read before the Public Health Administration Section, American Public Health Association, Rochester, N. Y., September 8, 1915.

SYSTEMS of school medical examination in different parts of the United States vary from the most rudimentary ones to the more complex organizations designed to safeguard every phase of the child's life.

Boston blazed the way in 1894 when she initiated school medical inspection in the hope of checking the communicable diseases common to childhood. Chicago began in 1895; New York in 1897 and Philadelphia in 1898. During the past decade the spread of the movement from the greater cities to the smaller ones has been remarkable.

A survey made during the school year 1910-11 by the Russell Sage Foundation showed that in 1,038 cities and towns, or nearly 90 per cent. of the municipalities which have school systems, 443 cities and towns, or 43 per cent., had organized systems of medical inspection of school children.

In a recent investigation conducted by the United States Bureau of Education, reports were received from 1,467 cities and towns in the Union. The number having school inspection was 750 or 51 per cent.

In the year of 1909 there was legal provision for medical inspection of school children in three states. In 1914 school medical inspection was mandatory in seven states and permissive in thirteen.

The replies to recent questionnaires sent out by the United States Bureau of Education would indicate that 80 per cent. of the 1,467 cities and towns reporting employed school physicians and that the total number of physicians employed was approximately 2,500.

We are certainly indebted to Lillian D. Wald who was the first to recognize the importance of follow-up work.

The introduction of the trained nurse into the service has been rapid following an experimental demonstration of one month in 1902 by Lena L. Rogers, whose services were volunteered by the Henry Street Nurses Settlement of New York City.

According to the investigations conducted by the Russell Sage Foundation in 1911, there were 415 school nurses employed in 102 cities and towns.

In a summary prepared by the Bureau of Education I note that in the beginning of 1915, 923 nurses were employed in 268 cities and towns reporting.

A system of records is maintained in 585 cities.

I shall not take up in my report, the actual results achieved by school medical examination either for the detection of communicable diseases or the correction of physical defect which interfere with school efficiency. It is impossible to get definite statistical evidence.

There can be no doubt but that much has been done in preventing the spread of communicable diseases among school children. With improvements in the systems, placing medical inspectors on full time, by the adoption of standard methods, and a continued enthusiasm, we should see an appreciable drop in the morbidity of diphtheria, scarlet fever, measles, mumps and whooping-cough.

Educators are a unit in declaring that, as a result of school medical examination, the physical and mental standards of the children have been raised very materially. American cities offering statistical reports regarding defects treated, show that anywhere from 10 to 60 per cent. of the children needing treatment were benefited. While a certain irreducible minimum of defectiveness must remain uncorrected, it seems certain that this minimum has not been reached. Let me give you a few concrete examples of the effectiveness of school medical examination.

In New York City during the years of 1913 and 1914, 55,163 children were discovered with defective vision. Of this number 27,613 or 50 per cent. were benefited by glasses. During the last two years, in our own city, 3,475 children attending public and parochial schools, whose vision was defective, were noted by the school

physicians. Seventeen hundred and seventy-nine of these children or 51 per cent. were wearing glasses on or before June 20, 1915.

Seventy-three thousand, one hundred and eleven school children with enlarged tonsils were reported by the inspectors of New York City in 1913 and 1914. Of this number 18,507 or 25 per cent. received operative treatment.

Surgical interference was the method employed in treating 1,075 or 35 per cent. of the 3,033 school children who had diseased tonsils and adenoids in Cincinnati during the last two school years.

Ten years ago little or no attention was paid to mouth hygiene of school children, and still there was probably no single defect that contributed more to absence from school than the carious tooth. Now we have systematic dental inspections in 400 cities and towns. Free dental clinics for indigent school children were in operation in 130 American cities in the beginning of 1915.

The movement owes its rapid development to a universal appreciation of the importance of oral hygiene and in particular to the findings of school physicians employed in the work of school medical inspection.

Along with the treatment of diseased teeth, we find the dentists at the head of an educational propaganda which is overwhelming teachers, parents and children with the importance of prophylaxis.

The recognition of incipient and potential cases among school children plays an important rôle in the control of tuberculosis. In America comprehensive systems embracing thorough physical examinations are far from general. However, in many of the larger cities, we have regular examinations beginning with children in the lower grades and as a result we have crystallized a sentiment in favor of handicapped children.

Providence, Rhode Island, was the first American city to recognize the importance of fresh air treatment for its blighted children. An open air school was established in 1908. At the present time there are over five hundred open air schools for anæmic and pretuberculous children in 250 cities in the United States. In many of our cities we see hospital schools for tuberculous children. Summer camps have followed in the wake of medical inspection. I

know that in our own city, the Anti-tuberculosis League would not have conducted its magnificent summer camp during the past three years had it not been for the survey of 1913 in which 36,438 public school pupils were examined for evidences of anæmia and tuberculosis, by the school physicians.

As a general conclusion from investigations made in this country by school physicians it seems fair to place the probable number of mal-nourished children in American cities at 10 per cent. of the school population.

I am firmly convinced that it was a double appeal, suffering childhood and the ignorance of some parents, that prompted our good women, headed by Miss Ella Walsh, to organize the Pioneer Penny Lunch Room in the Jackson School during the month of April, 1908. The scope of the work has not only been extended in Cincinnati, but school feeding constituted a part of the elementary school system of 70 American cities in 1913.

As a phase of child welfare, the Little Mothers Leagues occupy a position of prime importance.

The intelligent interest displayed by the girls who avail themselves of this opportunity to learn the principles of personal hygiene, home sanitation and the care of younger children, is astonishing; their expression in the work inspiring. Since the organization of the first League in New York City four years ago, some provision is made for this kind of instruction in 73 cities.

In New York City health leagues have been established whereby the children themselves, through their own organizations, not only keep themselves clean, and as far as possible free from disease, but also see to the correction of physical defects of the other children in their classes. Dr. Josephine Baker affirms that the work has been a great success. It has lessened the amount of work the nurses were compelled to do and has aided not only in the prevention of disease, but in increasing the percentage of corrections of defects.

We find that the course of instructions outlined by the American Red Cross has been very valuable in teaching high school girls elementary hygiene and home care of the sick.

According to Miss Jane DeLano the course is gaining favor in many large cities. We believe

that all girls should have the benefit of a few lessons in home nursing; not that we wish to encourage them to take up nursing as a profession but rather that they should be able to assist intelligently in the home during time of illness.

During the past two years we have been fortunate in securing for this work the services of the director, whose services were volunteered by the local chapter of the Red Cross Association.

I might say more but I feel that I have already trespassed upon your time.

Those of us who are engaged in the work must feel that it is a splendid privilege to participate in a movement which is revolutionizing old traditions of education.

Children are responsive and as a result of a world-wide endeavor to conserve and promote the health of school children, we have awakened a hitherto unknown responsibility of parents for their children; we have crystallized public sentiment in favor of a better race.

In the school lunch-rooms children learn to appreciate the value of good food and, as a result, knowledge in the selection and preparation of wholesome food is disseminated in the home.

Years ago when standards were low we were content to leave the sick, the sightless, the crippled, deformed and mentally deficient children in the same class-room with normal children. Now, as a part of our duty, we are recommending that these handicapped children should be taught along special lines that will reduce the effect of their handicap and enable them to become useful citizens. With what result? We have hospital schools for the crippled and deformed in several states; special classes and schools for those who are deficient mentally, in larger cities, schools for the blind. Conservation of vision classes for children who have progressive myopia, opacities of the cornea and deformities of the lens, have been established in Boston, Cleveland, Toledo and Cincinnati.

Psychologic clinics for the proper classification of retarded school children were established in 33 American cities early in 1915.

This is an opportune time to say a word about the examination of children of pre-school age. Encouraged by the results that we were getting in the schools, Dr. Wade MacMillan, upon his request, was encouraged to organize a Bureau of Child Welfare, which should be

under the supervision of the health officer and his assistant. Its purpose is to supplement school medical inspection by a thorough medical examination of children during the first six years of child life.

The staff consists of an experienced surgeon in orthopedics and the surgery of childhood; a physician of experience in the diseases of children; a specialist in the diseases of the eye, ear, nose and throat, and a school nurse. All members of the staff serve without pay.

The Board of Education authorized the use of school houses for meeting places and volunteered the coöperation of principals and teachers.

The Bureau is not a clinic, nor is it designated for any class. It is for children, just as the public schools are for children. The Bureau aims to create a health sentiment. The presentation of children is purely voluntary. If defects are found, the mothers are advised of them. No medical or surgical treatment is offered. Parents are referred to their family physician, clinics or hospitals.

Kindergarten teachers in the school serve as social workers. They take the histories and do follow-up work.

After working from February until June in one school conducting two conferences each week, the promoters found that the district was not nearly exhausted. A tabulation of the pathologic conditions found will be made after the doctors have finished in the district. The generous response of the parents seems to be a good argument for the continuance of such work. During the coming school year we expect to have four groups of examiners in as many districts. As far as we know this Bureau is the first of its kind established in America.

While we are reviewing the corrective work that is being carried on in so many cities and towns, we must not lose sight of the educational propaganda conducted by the various agencies who are trying to promote the health of school children.

Women with special qualifications are being engaged as lecturing school nurses. In many states, county and district nurses are undertaking this work by which children in public and church schools are instructed in personal and home hygiene, the prevention of tuberculosis and other communicable diseases, and first aid to the sick and injured.

REPORT OF COMMITTEE ON VENEREAL DISEASES.

W. F. SNOW, M. D., *Chairman.*

Read before the Public Health Administration Section, American Public Health Association, Rochester, N. Y., September 8, 1915.

IT HAS been the custom of the American Public Health Association to appoint from time to time committees instructed to report upon unsolved problems of investigation or administration of general interest to its members. Sometimes there have been committees whose work has extended over a series of years, a progress report being submitted for discussion each year. More frequently these committees have reported and been discharged, a new committee being appointed in subsequent years when their respective subjects have again come to attention through new discoveries, or the development of original methods of administration. In this latter way the reduction of venereal diseases has been the subject for report a number of times, the last committee having reported at the Milwaukee meeting in September 1910.

Your present committee, therefore, deems it proper to consider the report of 1910, as a summary of the prevailing opinions prior to that date, and to present its material as a progress report with certain recommendations for your consideration.

The 1910 report was submitted by a committee of which Dr. George M. Kober was chairman. The other members were, Drs. J. R. Kean, Charles N. Fiske, J. W. Kerr, Eugene H. Porter, George W. Goler, Juan Brena, Gardner T. Swarts, the latter having recommended the appointment of the committee in his address as president of the Association in 1909. These names alone are sufficient guarantee of the care with which this report was prepared. It was adopted by the Association and published in the 1910 proceedings. The report emphasized five major factors in the public health campaign against venereal diseases:

I. The recognition, study and control of the prevalence of gonorrhea and syphilis by the State Boards of Health, as communicable diseases dangerous to the public health.

II. An educational campaign for parents of all social classes and children of all ages and sexes.

III. Advocacy of temperance on account of the relationship between alcoholism, venereal diseases and insanity.

IV. Advocacy of personal cleanliness and venereal prophylaxis for those whose carnal appetites cannot be controlled by the agencies of moral prophylaxis.

V. Advocacy of early marriage.

Marked progress has been made along practically all the lines of endeavor specified under each of the major headings noted above. There is appended herewith the detailed recommendations of the committee, together with illustrative material showing the advances made in their application during the past five years.

Since these diseases belong to the group in which both the individuals infected and those exposed must intelligently coöperate with the health authorities, if satisfactory results are to be obtained, it is obvious that popular education has been and continues to be a necessary antecedent to administrative action. The general educational work emphasized by the committee of 1910 has been, in large measure, established. There remains the necessity for directing the attention of the public to specific measures which each community should adopt.

It is the consensus of opinion of those who have seriously attempted to establish protective measures against venereal diseases, that certain moral, social and legal factors, as well as medical factors, must be considered in any successful plan for effecting a considerable reduction in their prevalence.

In attacking any disease from which he is attempting to protect the public, the health officer first secures, through surveys, physicians' reports and personal interviews, all the information obtainable upon existing cases, and arranges for their treatment and supervision under conditions which will preclude transmission. He then proceeds to carry out such additional measures as are calculated to protect the non-infected portion of the population under his charge. Looking toward the future, he finally

endeavors to secure those community conditions, or standards of personal hygiene or conduct which will prevent the recurrence of the disease in the community.

The following tabulation of measures directed against syphilis and gonorrhea is arranged for discussion in accordance with the procedure just outlined.

A digest of various plans in operation, arranged under these headings, is appended:

I. MANAGEMENT OF EXISTING CASES.

1. Provision of Public Health Laboratory equipment for free examinations for evidence of syphilis and gonococcus infections.

2. Provision of ample facilities at public expense for clinical diagnosis and advice in cases of syphilis and gonorrhea.

3. Provision of adequate treatment for ambulatory cases, free of cost to those requiring public assistance.

4. Provision of adequate hospital facilities for syphilis and gonorrhea patients in all stages of their diseases, in general hospitals.

5. Extension of hospital social service work to syphilis and gonococcus infection cases.

II. PROPHYLAXIS.

1. Compulsory notification of syphilis and gonococcus infections to the health departments for proper action in protecting the public.

2. Instruction of patients in measures for the protection of others.

3. Promotion of continence as the greatest factor in personal prophylaxis.

4. Dissemination of general information concerning syphilis and gonorrhea and their methods of transmission.

5. Utilization of approved medical prophylactic measures under proper supervision.

III. MEASURES CONTRIBUTING TO THE REDUCTION AND ULTIMATE ERADICATION OF SYPHILIS AND GONOCOCCUS INFECTIONS.

1. Repression of prostitution through law enforcement.

2. Provision of ample facilities for wholesome play and recreation; and elimination of environ-

mental and social conditions, which encourage extra-marital sex relations.

3. Elimination of alcoholic drinks.

4. Promotion of sex education and standards of personal conduct which are in keeping with high moral principles.

5. Encouragement of early marriage after maturity and promotion of economic and social conditions conducive thereto.

Your committee believes that the practicability of effectively combating venereal diseases has been demonstrated, and that this work should no longer remain in President Sedgwick's list of conspicuous failures in public health. The people have accepted the typhoid death-rate as evidence of good or bad sanitation of a given community. The individual patients are not known to the public or condemned, even though many of them might be censured for having failed to protect themselves; and every effort is made to restore them to health while protecting the public from their infection. Venereal diseases have not been so accepted and recorded largely because of the moral stigma attached to the individual victim. Every effort should be made to direct attention, as in typhoid fever, to the community responsibility. An unusually low typhoid morbidity without explanation is a liability rather than an asset to a community. It is probable that, as our cities and states frankly acknowledge the existence of syphilis and gonorrhea, and provide for combating them, the same attitude will develop toward them.

It will be readily seen that your committee, after reviewing the developments of the past five years, has practically restated the recommendations of the earlier committee. This shows how far ahead of application our scientific knowledge of these diseases has been.

In order to actively stimulate progress in this important field, it is recommended that a Committee on Venereal Diseases be continued for several years, with instructions to bring in a report of notable progress each year.

WILLIAM F. SNOW, Chairman,
J. H. LANDIS,
POWHATAN S. SCHENCK,
J. N. HURTY,
W. A. EVANS.

REPORT OF COMMITTEE ON REFUSE COLLECTION AND DISPOSAL.

SAMUEL A. GREELEY, *Chairman*, RUDOLPH HERING, WM. F. MORSE, E. R. CONANT, W. T. KNOWLTON, *Committee*.

Sanitary Engineering Section, American Public Health Association, Rochester, N. Y., September 10, 1915.

SINCE the last convention of the association in the fall of 1914 there have been few developments in the practice of refuse collection and disposal. Such new work that would be of interest to the association is briefly reviewed as follows:

New Plants.—One of the most interesting developments of the year has been the construction of garbage reduction plants for the cities of Schenectady, N. Y., and Akron, Ohio. These plants are for municipal operation. They are among the smaller plants of this type. The city of Los Angeles has taken up the reduction of garbage, having awarded a contract by which the city receives fifty-one cents for each ton of garbage delivered to the contractor, but the city must furnish all water used at the work, free of cost to the contractor. The old pig-farm has been abandoned.

A rubbish sorting and incinerating plant is under construction at Columbus and the high temperature refuse incinerator at San Francisco has been in operation on a test basis. A considerable number of smaller towns have installed garbage furnaces using an auxiliary fuel.

Investigations.—Two interesting investigations have been made in the city of New York. One consists in a large scale experiment on house treatment and collection of refuse. The tractor-trailer system has been adapted to collection work. The other investigation relates to the elimination of odors from garbage reduction works, the work having been carried out at the Barren Island Reduction Plant.

In Chicago, although no technical bureau has been established, investigations have been continued on the mechanical analysis of refuse.

In Milwaukee, the use of motor trucks for the collection of ashes has been giving an extended trial.

Specifications.—Of special interest to municipal officials contemplating the installation of high temperature incinerators are two court cases at Atlanta and San Francisco. In these cities the city officials have refused to accept the plants built, on the basis that the specifications have not been fulfilled. In Atlanta the decision has been in favor of the contractor. No decision has as yet been reached in San Francisco.

Standard Forms.—Although this committee has not actively made use of the standard forms of statistics of municipal refuse, it is good to know that the form has been published by the American Society of Municipal Improvements in their leaflet of standard forms which they have adopted. Copies of this leaflet may be secured from Charles Brown, Secretary, 702 Wulsin Building, Indianapolis, Indiana.

Mr. Knowlton of our committee has tabulated statistics from a number of towns using the standard forms.

General.—The instances noted above include the principal sources of information in refuse disposal work which have developed during the past year. Detailed information can be secured by writing to each municipality.

In the report of the committee last year, attention was directed to the practice in smaller communities of buying garbage plants on contractors' specifications. This practice is again condemned by the committee as resulting in poorly built plants of short life, which are unsatisfactory in operation.

Book Reviews.

Royal Commission on Venereal Diseases. *Final Report of The Commissioners. Presented to both Houses of Parliament by Command of His Majesty. T. Fisher Unwin, Limited, London, W. C. 1916. Price, 1s. 11d.*

The final report, recently received in this country, of The Commissioners of the Royal Commission on Venereal Diseases appointed in 1913 to inquire into the prevalence of venereal diseases in the United Kingdom of Great Britain is of high importance. This Commission comprised such representative men and women of England and was given such powers of calling before it the ablest physicians and military, hospital, and public health authorities, that its general conclusions warrant reading in full.

"Our task is now ended. We have endeavored to make clear the grave and far-reaching effects of venereal disease upon the individual and the race. The evidence we have taken proves conclusively that these effects cannot be too seriously regarded, and that they result in a heavy loss, not only of actual but of potential population, of productive power and of expenditure actually entailed. For reasons largely due to the special character of these diseases and the moral stigma attaching to them, it has been found impossible to present accurate estimates of the degree of their prevalence. We have, however, been able to arrive at some important conclusions in regard to their relative prevalence socially and geographically.

"The medical evidence establishes the fact that, by early and efficient treatment, these diseases could be brought under control and reduced within narrow limits. It is beyond doubt that, on the one hand, treatment is in most cases unduly deferred, and that, on the other hand, adequate facilities for the best modern treatment do not exist. Recent discoveries have armed the medical profession with means of combating venereal disease which were unknown in the past. The object must be to bring these means to bear upon every infected person at the earliest possible moment.

"We are convinced that this object can be accomplished only by the action of Government directed to the solution of a great national problem. We have recommended no drastic remedies, and except in certain special cases we have not advocated compulsion in any form. The measures which we proposed contemplate

extended facilities for bacteriological diagnosis combined with the provision of adequate and skilled free treatment, the cost of which, we consider, should fall mainly upon the national exchequer. These measures, if adopted without delay, will go far to remove the grave evils which our investigations have brought to light. At the same time, we hope that the knowledge of the gravity of venereal disease which our report will impress upon the public and the teaching which we recommend will have the effect of inducing infected persons to make full use of the facilities for treatment which, we trust, will be provided forthwith.

"The terms of our reference precluded consideration of the moral aspects of the questions with which we have dealt. We are, however, deeply sensible of the need and importance of the appeals to conscience and honor which are made by the religious bodies and by associations formed for this purpose. We believe that these appeals will gain force if the terrible effects of venereal disease upon innocent children and other persons who have no vicious tendencies are more fully realised. Our evidence tends to show that the communication of disease is frequently due to indulgence in intoxicants, and there is no doubt that the growth of temperance among the population would help to bring about an amelioration of the very serious conditions which our inquiry has revealed. We are also conscious of the fact that overcrowded and insanitary dwellings indirectly contribute to the spread of disease, and from improvements in this direction we should expect some diminution of its prevalence. Improvement in the moral standard and in social conditions may, however, be slow, and we are convinced that upon ample provision for early treatment and readiness to take advantage of it any real progress toward the diminution of these diseases as a most baneful factor in the national life must mainly depend.

"We recognise that the measures which we proposed will need for success more than legislative and administrative measures taken by Government. Continuous and consistent efforts will be required to keep the complex

question of combating venereal disease before the public mind, and to secure the constant assistance of voluntary agencies concerned in prevention and rescue work. We hope that the National Council established with this object will become a permanent and an authoritative body, well capable of spreading knowledge and giving advice in regard to this question in its varied aspects, and that it will be recognised as such by Government.

"Our report must issue at a time when all public activities are preoccupied in fulfilling the manifold needs of war. We are conscious of the disadvantage thus arising, and we feel that there is some risk that our recommendations may not receive the immediate attention which their national importance demands. We desire, therefore, to place on record our strong opinion that the conditions now existing and those which must follow on the conclusion of the war imperatively require that action should be taken without delay. There is no reason to believe that the percentage of infection in the naval and military forces is now greater than in normal times; but there can be no doubt that the total of infected persons has increased. The military authorities are doing their utmost to provide treatment; but the civil population requires corresponding measures, and all experience shows that after a war an excessive incidence of disease is certain to occur, even in districts previously free. In order to meet present and future conditions, it is essential to make provision, and no time should be lost.

"Lastly, we wish to lay stress upon the needs of the future. The diminution of the best manhood of the nation, due to the losses of the war, must tell heavily upon the birth-rate—already declining—and upon the numbers of efficient workers. The reasons for combating, by every possible means, diseases which in normal times operate with disastrous effects alike upon the birth-rate and upon working efficiency are, therefore, far more urgent than ever before. Now and in the years to come the question of public health must be a matter of paramount national importance, and no short-sighted parsimony should be permitted to stand in the way of all means that science can suggest and organization can supply for guarding the present and future generations upon which the restoration of national prosperity must depend."

These general conclusions are preceded by a series of thirty-five specific recommendations falling under legislative, administrative, and educational heads. The report contains 191 pages and is full of interesting data on the prevalence, effects, and means of alleviation or prevention of these diseases. One is impressed throughout the report with the need for considering the venereal diseases from the national point of view. Repeatedly, the suggestion is made that the national treasury should pay 75 per cent. of the costs and the local community 25 per cent. Emphasis is placed on not limiting treatment to those who obviously cannot pay a private physician, or to those who reside in a particular area. Evening clinics with hours convenient to the working classes and the free provision of salvarsan or its substitutes at the discretion of the local authorities are advocated. The report states that "the obligation should be impressed on all doctors who treat syphilis and gonorrhea in institutions or privately to hand cards of instruction and warning to their patients." The use of general hospitals and dispensaries for providing the institutional treatment, rather than special institutions, is urged. Effective warfare on medical quacks and their advertising is proposed.

In brief, all the best measures which our American cities and states collectively are trying out are presented. The provision of adequate facilities for early diagnosis and treatment is chosen as the most promising line of attack. The reporting of venereal diseases is not recommended until experience has been gained in operating the improved facilities for diagnosis and treatment. But the recommendations include amendments to the registration laws providing for confidential registration of causes of death, and for "privileged communications" by the physician to "a parent, guardian or other person directly interested in the welfare of a woman or man, and with the object of preventing or delaying a marriage with a person who is in an infectious condition from venereal disease." Especial importance is attached to the establishment of a uniform system of records for venereal diseases in hospitals, statistics of the number of patients for whom salvarsan is provided at public expense, and similar data.—
Dr. Wm. F. Snow.

Health Department Reports and Notes.

REPORTS.

Porto Rico.

The report of the Director of Porto Rico for 1915 represents a year of hard work under the most difficult conditions, made even more so by the lack of sufficient force and funds. The sanitation work on the island is in a period of formation and transition, a fact which throws on the board a great responsibility in the preparation of sanitary regulations and necessitates frequent amendments to meet new conditions. The responsibility of enforcing these regulations was left to the subordinate officers and the report of each is compiled almost verbatim in this report.

Unfortunately there has been a reduction of almost 50 per cent. in the appropriation for this service since 1911, as a natural consequence of which, the mortality rate has increased from 18.44 per 1,000 during 1913-1914, to 19.78 for 1914-1915. Yet it is of interest to note that this mortality rate is lower than at any time prior to the organization of this service.

In remarking on the medical service of the island, particularly in connection with attendance on the sick-poor, it is stated that more than half of the persons who die in the island are not seen by a physician either before or after death. To a large extent this is due to the difficulty in traveling in the interior.

Nothing so well exemplifies the result of cutting down the appropriation as do the returns from malaria. Due to a lack in funds, the mosquito eradication campaign, begun in 1911, was stopped. In 1911 the mortality was 1,208; 1912, 1,005; 1913, 517; 1914, 719.

It is seen from the more reliable statistics of certain cities that an appalling situation is arising through the increase in pulmonary tuberculosis. In the cities of San Juan and Ponce the number of deaths from tuberculosis of the lungs is as follows: 1912-13, 1,535; 1913-14, 1,483, 1914-15, 1,788. This situation cannot be relieved but by the appropriation of funds for a more complete care of cases. No sanitarium on the island will admit cases in the most ad-

vanced stage, and since this is the most effective stage for the transmission of this disease one can realize the importance of such appropriation.

It was recognized that it was of the utmost importance to the public health that a careful study should be made of its water supplies. Since it was impossible to carry this out on a large scale, it was decided to investigate the existing supplies in four cities. This was done after overcoming innumerable natural difficulties. A large part of the report is devoted to the report of the survey of the waterworks of these cities. Suffice it to say that the bacteriological reports showed that three of these water supplies, fed from the same source, were polluted, while the fourth was free from suspicion.

Of the regulations promulgated during the year, the three most important were those governing dairies and milk supply, bakeries and the sale of bread, and the protection of foodstuff. The director himself assumed the responsibility of inspecting the bread and bakeries, and in general conditions have improved. The greatest difficulty seems to be the insuring of the use of pure yeast. Some of the specimens submitted for examination were found to contain the organism which is believed to be the cause of sprue.

The infant mortality is 141 per 1,000 births, the principal fatal diseases being diarrhea and enteritis, conjugal debility, and infantile tetanus. Little of value can be gleaned from the morbidity or mortality reports, except possibly in the cities, since the reporting of a case of sickness is too often neglected, and, too, the diagnoses of many of the local doctors is often at fault.

All in all it represents a gigantic struggle against disease and ignorance, the degree of which can only be realized upon reading the report itself. The director and his staff are to be congratulated on doing what they have done, and it is to be hoped that they will soon have sufficient money so that they may realize in a more tangible way the success of their efforts.

New Bedford, Massachusetts.

New Bedford's report for 1915, though brief, gives evidence of progressive public health work. The health expenditure is liberal, totalling to over seventy cents per capita for the usually recognized health department functions. Such an expenditure is clearly called for in view of the fact that this city of some 110,000 population has all of the ordinary large city problems to meet. The death-rate is given as 15.67. The city has paid special attention to tuberculosis, as evidenced, for example, by the payment of over a third of the above allowance for maintenance of the local sanatorium. Attention is now being paid to infant welfare, the Federal Children's Bureau having recently made an investigation into the causes of the city's high infant mortality rate. As yet there is but one public health nurse under the health department, who divides her work between infant hygiene and tuberculosis. It is evidently desirable that even greater emphasis be placed upon the instructional work of nurses in comparison with printed matter, which must necessarily fail to affect even superficially a large proportion of the in-

habitants of a large industrial city of mixed population.

An epidemic of 23 cases of smallpox, nearly half fatal, occurred, costing the city \$8,000, or \$350 per case. Owing to the efficient vaccination of school-children, however, not a single case developed in the schools.

Three thousand eight hundred forty-seven dollars was spent for ophthalmia neonatorum work; certainly a surprising amount taken in connection with the 291 cases of sore eyes reported.

In connection with nuisances the board well advocates the coöperation of the police in the abatement of those minor nuisances which could be more efficiently dealt with by them.

The report could be improved by the addition of a page showing the organization of the department and by the conversion of the index into a table of contents. Mortality is tabulated by causes, but one misses the death-rates for important causes, while it is difficult to imagine the value of the present form of detailed tabulation by age, sex, and month.

Long Branch, New Jersey.

It is with a sense of pleasure that we review this report which marks the second year of progress in the aggressive work for health for 1915 of this little city of some 15,000. The first report of this city, reviewed in the November JOURNAL, clearly indicated the constructive trend of the health control of this community, and the work has been carried on with increasing efficiency and a constant broadening of endeavor.

As is the case with most small cities, the excellence of whose health work has demanded more than local attention, the health officer of the previous year, Mr. John Hall, resigned his position in July 1915 for a more responsible and better salaried position elsewhere. His successor, Mr. Nels A. Nelson, is carrying on the work of the board in the same capable manner.

It is stated that a great deal of time is spent in the abatement of nuisances, chiefly those of neglected cesspools and privies, accumulations of manure and improper disposal of wastes. This state of affairs is unfortunate in that it cuts into time which could be more profitably

spent in other directions. As is suggested, the laying of sewers in all streets and an improved system of waste collection are necessary to properly remedy such conditions.

Nevertheless, nothing has been allowed to interfere with the carrying out of methods essential to the maintenance of community health, with the very satisfactory results that the infant mortality death-rate is the lowest on record, 89 per 1,000 births; that the general death-rate is the second lowest in the last six years of which there is data, being 14.5 per 1,000 for the permanent population or 10.6 for the yearly average population of 20,000; that the birth-rate continues to be above the average; that excluding deaths from tuberculosis, only three of the 212 resident deaths occurred from the so-called preventable diseases, and nineteen only were due to preventable disease, tuberculosis included; that with the exception of a few dairy scores, the milk supply is better than at any previous time.

The board of health is justly indignant over its financial situation. Of the total appropriation for this city's expenditures of \$243,524, the board of health received \$2,500 or 1.02 per cent. or a per capita expenditure of 17.1 cents, or, reckoned on the basis of the average yearly population, of 12.5 cents. This is too low, and the health officer is to be greatly commended on the excellent results he has accomplished in spite of this discouraging fact.

In outlining the work of the future, Mr. Nelson asks for a board of health physician for diagnostic purposes; the placing of the work of recording and collection of vital statistics in the office of and under direct control of the board of health; the replacement of the practice of fumigation for the more modern and efficient practice of thorough mechanical cleansing; a cam-

paign against polluted wells and cesspools and privies abutting on the property of the public sewer; an ordinance requiring meat inspection, and appropriation for work of fly and mosquito extermination within the city limits.

Naturally, in establishing a modern system of health control in a small city, certain aspects of the general problem must be at first overlooked, both because they seem less important than other factors and because of the enforced limit of expenditure. It is to be hoped that, with interest created in the public mind for an increased health appropriation, the Long Branch board of health will soon be able to include in its activities work on the control of food supplies, infant hygiene work and greater laboratory facilities.

Springfield, Massachusetts.

The report of the Springfield health department for 1915 opens with an excellent general discussion of conditions and aims such as is necessary for ready comprehension of the work in a city of the 100,000 class, but is too rarely found in their reports. A comparison is made between the per capita cost of the health work, which was 31.8 cents, and the results obtained as in a degree indicated by the death-rate of 14.67. Where health work is bringing as tangible results as it does in Springfield, vague generalities about "general improvements in health conditions" are well replaced by specific statements and figures. The board aptly says that "we must take into consideration the value of lives saved in drawing conclusions as to value received for money expended," but wisely refrains from attempting the sort of problematical calculations, involving dollars and lives, which have led some health officers into unconvincing hyperbole. Credit, moreover, is given to certain health agencies, not under the control of the health authorities, with which it is evident that goodly coöperation exists. An idea which is impressing itself increasingly upon observant health officers is expressed in the following paragraph:

"Good health, at middle age, means intelligent and proper care during the developmental and early period of life. Lessened mortality rates at present are due chiefly to the exten-

sive work on the better care of infants and mothers and the better control of contagious diseases. The percentages of deaths in the age periods above fifty years are not diminishing. In certain diseases they are increasing, and it is in the prevention of the degenerative diseases in middle life that the broader activities of health departments are concerned."

Again, there is real constructive suggestion in the following: "Building for the future is as important in health work as any other, and a field of operation which is most likely to be valuable in the future is connected with the children of the public schools. A sound physical foundation becomes necessary if the educational system is to produce its best results. Economically considered, it is highly important that the children, who leave the public schools in such large numbers at sixteen years of age, should carry with them definite ideas of the value of good health and the way in which it is secured."

And this: "While the abolition of poverty and ignorance, with elimination of degenerates and defectives, may never be accomplished, there is much to be done in lessening these untoward social conditions, which should receive earnest and willing support, and those features of the social uplift which are most directly associated with improvement of the public health are legitimate functions of health department work."

Regarding the balance of power between central and local authorities, the report has the following to say: "Referring to the administrative control of public health, it may be noted that at the time when the State of Massachusetts is entering on a campaign for a central control of public health work through the reorganized State Department of Health, the United States Public Health Service is advocating more authority for local boards of health, and says that health problems are to a great extent local in nature and should be under local control."

Hartford, Connecticut.

The 1915 report of this city of 108,969 population shows a decrease in the crude death-rate from 17.56 to 17.50 per 1,000. Correcting this by excluding the non-resident deaths, the rate per thousand is 13.91 compared with 14.03 for last year, which is reasonably creditable for cities of this class.

A substantial reduction of deaths from tuberculosis has been effected, although the number of new cases shows an increase. This increase, however, is attributed to the fact that better methods have been developed for following the cases.

There were 145 cases of typhoid in this city for 1915, with a death-rate of 18.3 per 100,000, an increase over last year, due mainly to an outbreak in August due to milk supply infection. According to the typhoid report of the American Medical Association, Hartford was in thirteenth place out of sixteen cities of this class, Cambridge leading with a low death-rate of 1.8 per 100,000. This seems to be Hartford's most serious problem.

Pneumonia was the largest single cause of death, demanding a total of 231 deaths. Heart disease and apoplexy were second and third respectively. Twenty-eight cases of syphilis

Little criticism can be made of the clear discussion and ample numerical data presented in the report. It would be advisable to follow standard practice by adjusting previously estimated populations in accordance with the recent census. Deaths are tabulated in a much extended table the detailed items of which can yield little of practical value. It may be suggested that such items can effectively be utilized only in shorter tables directed to specific purposes. A table of contents would enhance the appearance and convenience of the report.

and eighty cases of gonorrhea were reported anonymously in accordance with the state law, a result which can by no means be complete, though it represents a step in the right direction.

The infant death-rate was 107 per 1,000 births, a reduction of one since last year. The board of health is anxious to improve on this and laments the fact that their present birth law, which does not require the birth to be reported till the seventh day of the following month, renders very difficult any scheme of post natal nursing. It seems that the school inspection is limited to examination for communicable disease, and, while this is excellently done, the board wisely advocates extending this to health inspection, dental work and the follow up work of the school nurse in the homes of the children.

A novel idea incorporated in the section devoted to vital statistics is a table of occupations of those who died during the year. It is doubtful as to the benefit of such a tabulation without other correlating factors being noted too, but the departure is interesting. It is unfortunate that this report should lack an index for otherwise it is excellently prepared and complete.

Plainfield, New Jersey.

From Plainfield, of the small city class, one has come to expect a well-presented account of well-executed routine work plus progress from year to year, and the present report is no exception to the rule. The point of attack is now the control of infant mortality and of communicable disease through a desired public health

nurse. A special point has for some years been made of milk and cream supplies, the character of which is set forth in clear tabulation of laboratory results. The supplies are of high bacteriological character and pasteurization is on the increase. Communicable diseases, especially tuberculosis, are discussed in adequate detail.

Under the head of diphtheria the value of the Schick test is recognized and it is stated that the procedure of culturing all contacts and isolating carriers has been adopted. In the tabulation of deaths it might be recommended that the specific titles, not merely the classes of the International Classification, be given. The report closes with a plea for a city planning

commission, which would bring about a better correlation between the several city departments. The death-rate, 13.13, is calculated by the rather empirical method of excluding deaths of non-residents and adding to the result half as many to allow for the number of residents who died away from home.

Winchester, Massachusetts.

One of the early 1915 reports is that of Winchester, which records the low death-rate of 9.6 in its population of about 10,000 with absence of deaths from diarrheal disease as a salient feature. It does not, however, appear whether this record also applies to the communicable diseases of childhood. The board gives the curious statement that "while collecting swill is not a health measure, the failure to collect

it properly is obviously a health question" as its reason for desiring to continue with this work instead of recommending its assumption, as with refuse collection, by the selectmen. The town prides itself upon its control of milk supplies, which it carries on with the assistance of the laboratory of the coöperative health organization of Wellesley and surrounding communities.

NOTES

Local Health Boards Must Prosecute Law Violators.—In the April *Public Health News*, issued by the New Jersey Department of Health, physicians, midwives, undertakers, clergymen and local health officers are warned that hereafter there shall be no discrimination in prosecution for the violation of health ordinances. In other words, should any member of the above professions fail to comply with the requirements of the law regarding the reporting of births, deaths and marriages, they shall be prosecuted.

Below is the resolution passed by the State Department of Health in this respect:

Resolved, That the Director of the State Department of Health with the aid of the Chief of the Bureau of Vital Statistics shall take prompt and vigorous measures to enforce the laws of the state relating to the reporting of births, marriages and deaths, and that in any and every case of failure of the responsible party to properly report a birth or marriage within five days and to exchange a certificate of death for a burial permit before burial, the said Director and Bureau Chief shall, as soon as that failure becomes known to them, mail a notice of such failure to the local board of health and to each member thereof in whose jurisdiction the violation occurs, accompanied by a warning that if

said board does not order prosecution and submit to the State Department of Health proof of such prosecution of said delinquent person or an excuse for the delinquency acceptable to the Director of the State Department of Health, then the said State Department of Health will sue, in cases of failure to report births, under chapter 389, of the Laws of 1915, to recover penalty from each member of the local board except any member who may have voted to prosecute the violator of the law; for failure to report marriages, prosecutions will be ordered under chapter 199, Laws of 1912; and for failure to exchange a certificate of death for a burial or transit permit before burial takes place prosecution will be ordered under chapter 109, Laws of 1909.

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State Health Train.—Below we quote the descriptions of the Florida Health Train, offered by the *New Smyrna (Fla.) News*:

"With the establishing of this 'health train' the State of Florida has taken a step in advance of other states in bringing directly to the people methods of disease prevention and teaching them how easy it is to preserve the health of any community.

"Car number one, the living car for the accommodation of the representatives of the State Board, contains the office in the observation end, four staterooms, bath and toilets, dining room and kitchen. Like the other cars of the train, it is heated with electricity generated by a dynamo in car number two, and like the others it is carefully screened and ventilated.

"Car number two contains in one end the dynamo, driven by a gasoline engine, and the sleeping quarters for the special train crew. The larger part of the car is devoted to the installation of various models, as that illustrating the Imhoff sewage disposal system, another showing how water in driven or open wells is contaminated by drainage from stable, outhouse and polluted surface water. A miniature model shows a dipping vat for ridding cattle of the tick. A model dairy is illustrated in the same manner; the proper feeding and clothing of babies and the open-air treatment of tuberculosis and many other practical questions of sanitation and disease prevention are similarly illustrated.

"This car is also fitted with a stereomograph with a capacity of 104 lantern slides, and this is lighted and operated automatically by electricity generated in the car itself.

"Car number three is divided through most

of its length by a partition, on which are displayed 36 panels. These carry in graphically worded sentences warnings and advice on sanitary subjects and disease prevention. Numerous electrically operated models and a large stereomograph, similar to that in car number two, are also arranged to splendid advantage in this part of the train.

"In this car will be installed an expensive and elaborate contribution from the Florida Dental Society, which will show various diseases of the teeth, and the proper attention that should be given to them. In this car is gathered much of the equipment that has special significance in sanitation.

"A complete inventory of the educational equipment of these cars is unnecessary. The train with all its invaluable contents is to be brought within the reach of every person in Florida who can go to the nearest railroad station, and it will be taken wherever rails are laid on which it may run. It is to be permanent, a perpetual traveling school, illustrating forcefully and graphically how better health conditions, better sanitation and better living may be brought to every Floridian. When it has carried to every part of the state its object lessons, the journey will be repeated, with newer models and the later discoveries of medical science."



A HEALTH CREED



FOR MASSACHUSETTS BOYS AND GIRLS

MY BODY IS THE TEMPLE OF MY SOUL

Therefore:—

- I will keep my body clean within and without ;
- I will breathe pure air and I will live in the sunlight ;
- I will do no act that might endanger the health of others ;
- I will try to learn and practice the rules of healthy living ;
- I will work and rest and play at the right time and in the right way, so that my mind will be strong and my body healthy and so that I will lead a useful life and be an honor to my parents, to my friends and to my country.

ISSUED BY THE MASSACHUSETTS STATE DEPARTMENT OF HEALTH

Diarrheal Diseases.—Dr. H. L. K. Shaw, Director of the Division of Child Hygiene of the State of New York, in the May issue of *Health News*, states that the number of diarrheal deaths in New York City under two years of age has steadily decreased from 6,360 in 1907 to 3,735 in 1915. Though the deaths from this cause in the rest of the state are in the aggregate much less in number, they have not shown the same proportional decrease.

To quote this bulletin on factors causing this decrease:

"The great predominance of deaths during the summer months amply justifies one's dread of summer diarrhea. Unfortunately, statistics are not available showing the number of babies fed on breast milk and those who are artificially fed, but in several places where such investigations have been made the ratio is about one to ten. Extremely hot weather, with a high humidity, lowers the resistance of the child and makes it more susceptible to infections through the alimentary tract. Investigations made by the New York Association for Improving the Condition of the Poor show very conclusively that the prevalence of flies had a marked influence on the number of cases of diarrheal disease. The very striking diminution of diarrheal deaths in New York City can be largely attributed to the improvement of the milk supply. It is fair to assume that the climatic conditions in New York City and the rest of the state were each year the same, and cannot be considered as a factor in comparing the two mortalities. All the milk in the City of New York, with the exception of certified milk, is pasteurized, and this precautionary measure has saved literally thousands of lives and prevented hundreds of thousands of cases of nonfatal diarrheal disease.

"Very little effort has been made in the rest of the state until recently to improve the milk supply in the various towns and cities, where the problem is far greater and more difficult of solution. The Public Health Council formulated the sanitary milk code which was put in operation in November, 1914. There has since been a decided improvement in the milk supply of a number of the larger cities, a number now using only pasteurized milk.

"The influence of this enlightened attitude with regard to the milk supply can be seen by comparing the number of deaths in 1914 with

those of 1915, when there was a decrease of 140 deaths in New York State at large, and an increase of 308 deaths in the City of New York.

"The statistics of diarrheal deaths point very conclusively to the fact that these deaths can be prevented by *pasteurization and the general improvement of the milk supply.*"

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How to Feed the Family.—In response to inquiries as to the minimum cost of food for a family, the New York City Department of Health published in its weekly bulletin for May 13, the following list of articles of food sufficient for a family for one week on the assumption that the family consists of two adults and three children:

1 lb. butter.....	\$0.42
1 bag sugar (3½ pounds).....	.24
1 lb. rice.....	.08
1 lb. dried peas.....	.09
1 lb. beans.....	.09
1 lb. farina.....	.06
1 lb. oatmeal.....	.05
1 box cocoa (¼ pound).....	.10
1 lb. prunes.....	.15
1 lb. onions.....	.04
6 lbs. potatoes.....	.22
1 head of cabbage (medium size).....	.05
1 lb. cheese.....	.22
2 doz. eggs.....	.60
2 lbs. meat daily at 20 cents.....	2.80
2 loaves of bread daily at 8 cents.....	1.12
2 qts. of milk daily at 7 cents.....	.98
Total.....	\$7.31

This list of foods was originally devised and has had its practical application test for about two years by the Social Department of the Beth Israel Hospital, where the nutritional results have been excellent.

*

Typhoid Fever in Toronto.—In 1910 the death-rate from typhoid in Toronto per 100,000 population was 40.8. In 1915 it was 1.9, leading all cities of 350,000 population and over in America. This represents a saving of one hundred and ninety-five lives per year, which, assuming that only one case of every ten or fifteen die, means the prevention of over two thousand cases. The April monthly bulletin of the Toronto Department of Health devotes itself practi-

cally entirely to the discussion of its typhoid and the causes of the reduction of its rate.

The largest factor in the reduction of its rate is attributed to the chlorinating of its water supply, and its bacteriological examination six times a day. No milk typhoid has been in Toronto since 1912, due to the requirement for pasteurization of all milk entering the city (except certified milk). Nor has there been typhoid fever from oysters or raw vegetables. Contact infection has been discounted by circulars of information on typhoid and its spread and advocating inoculation. The danger of fly transmission has been considerably cut down by publicity campaigns against flies and by the abolition of outdoor privies.

In examining the results of the epidemiological examination of the 151 cases of typhoid in this city for 1915, one of the most striking features is that 69 of these cases were infected outside the city. This in words of the report supports the "contention now commonly being made that typhoid fever is becoming a rural disease and is growing less and less frequent in the cities."

Turning to the inside cases, of the eighty-two cases, thirteen, or more than 15 per cent., were found to be due to either direct or indirect contact. The bulletin suggests that though typhoid is not generally considered a so-called contagious disease, this number of cases of contact origin does not substantiate this theory, particularly in view of the fact that these contact cases were among those who nursed or were in the homes of those who were originally infected.



Humidity and Temperature.—The Chicago Board of Health through its publicity service warns the people of stagnant and overheated air. Desirous of improving indoor humidity, which in the average American home is far lower than it ought to be, the department has submitted a table upon the relative humidity that should be maintained for a given temperature. The temperature ranges from 60 to 72 degrees Fahrenheit, and the relative humidity to be maintained for the respective temperatures is believed to be productive of approximately

ideal indoor conditions for both comfort and health.

Zone of Comfort Table.

- At temperature 60° Fahrenheit relative humidity as indicated by the hygrometer reading should be 66 to 74.
- At temperature 66° Fahrenheit relative humidity as indicated by the hygrometer reading should be 50 to 54.
- At temperature 68° Fahrenheit relative humidity as indicated by the hygrometer reading should be 40 to 48.
- At temperature 70° Fahrenheit relative humidity as indicated by the hygrometer reading should be 34 to 40.
- At temperature 72° Fahrenheit relative humidity as indicated by the hygrometer reading should be 30 to 34.

Of course, it is understood that along with a thermometer in the room there should be a hygrometer to give the humidity readings—in fact the hygrometer is fully as important an instrument to have in the home or workplace as is the thermometer. It is well understood that persons in normal health will be more comfortable in properly moistened atmosphere, temperature 66–68, than they will in a temperature of 70–72 with very low humidity.



A Good Sign.—Through the courtesy of the *Survey* we reproduce on the opposite page a photograph which well represents the trend of the modern movement to direct and protect those persons who unfortunately become afflicted with venereal disease. The notices on the right were posted in the washrooms of restaurants and barber shops to replace the signs of quack doctors shown on the left.

These photographs were taken by Dr. Alex Nicol Thomson and represent part of the excellent work being done by the pay-clinic of the Brooklyn Hospital and Dispensary, opened in August, 1915, commented on in the *Survey* of May 20 under the title of "Dispensaries of Today and Tomorrow."



TENTATIVE WEEKLY SCHEDULE FOR A PUBLIC HEALTH NURSE OF A DEPARTMENT OF HEALTH.

ONE NURSE ONLY BEING EMPLOYED

8.30 to 9.30		9.30-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	
Monday	Office hour	Child welfare	Lunch	Communicable disease, tuberculosis	dis- including	Off duty					Health center hour, adults or children		
Tuesday	Office hour	Child welfare work			Lunch	Communicable disease, tuberculosis	dis- including	Off duty					
Wednesday morning off to 1 p. m.					Classes, clinics and instruction in child welfare subjects								Dinner Health center hour, adults or children
Thursday	Office hour	Child welfare activities			Lunch	Communicable disease, tuberculosis	dis- including	Off duty					
Friday	Office hour	Child welfare		Lunch	Classes, clinics and instruction in communicable disease, including tuberculosis				Off duty				
Saturday	Office hour	Child welfare	Communi- cable dis- ease	Off duty to 7 o'clock							Health center hour		

—May Bulletin, New York State Department of Health.

Public Health Notes.

Mental Health of Children.—The California Society of Mental Hygiene, which is composed of physicians and social workers throughout the state, has prepared some suggestions for the protection of the mental health of children which are well worth remembering:

Give your child opportunity for a variety of wholesome activities and interests.

Train your child to work hard in some regular occupation suited to his ability and talents;

but to avoid fatigue by alternation of work and rest.

Train your child to give attention to the present situation.

Train your child to strict obedience in a few important matters and let him alone in regard to the unimportant things.

Avoid conditions that tend to produce overstrain or precocity. The special business of a

young child is to grow and to play with other children.

Give your child a variety of well-cooked, wholesome food in ample quantity at regular intervals.

Train your child to healthful habits of sleep in fresh air, giving opportunity for at least nine hours, and for more than that before the age of twelve.

If your child becomes worried or sleepless, or has muscular twitchings or the like, consult a competent physician at once.

Take advice of a competent person concerning the peculiar, sensitive or nervous child, in order to correct a possibly bad inheritance by proper education and environment.

The best method of training is by example.



Politics and Health.—The May number of the *Journal of the Outdoor Life* has the following live editorial on this very important phase of public health administration:

"Anyone who has had experience in endeavoring to secure appropriations or legislative enactments from a city council will agree that in our American municipalities politics and health are very closely related. Probably it would be impracticable and possibly undesirable ever to divorce them completely, but judging from the experience of Chicago in its recent dealings with the Municipal Tuberculosis Sanitarium, it would certainly appear necessary to place the community's public health activities on a basis where spoils, politics and petty political maneuvering could not destroy the efficiency of the work.

"Politics pervades the police departments and fire departments of our cities, to be sure, but our American municipalities have come so to recognize the vital necessity for protection of property that, in spite of the ambitions and activities of political bosses, these departments can be kept up to a reasonable degree of efficiency. Where is the health department, however, that is on a par with the fire and police departments of the same city? One could count such upon the fingers of one hand and still have fingers to spare. Efficient public health administration, so far as adequate backing of the public purse and keeping free from political jobbery is concerned, is practically unknown in this country. It is high time that our Ameri-

can municipalities awoke to the fact that their health is worth more than their property and that in order to protect the public health two things are needed, first, adequate finances, and, secondly, administrative facilities which shall be grounded upon efficiency and not upon spoils and rewards to faithful political adherents. When the time shall come that these two qualifications are met in our public health administration there will be evidenced not only a rapid decrease in the death-rate of tuberculosis, but in the death-rate of all other communicable diseases as well. People of any city in America may buy protection from disease just exactly the same as they buy protection from fire, from flood and from criminals, provided they are willing to pay the price."



Diphtheria Control.—The fallacy of depending primarily on laboratory tests for the control of diphtheria is emphasized by D. M. Lewis, New Haven, Conn. (*Journal A. M. A.*, May 13, 1916). Carriers, he says, are of two types, pharyngeal and nasal. The former show acute hyperemia with chronic pharyngeal hypertrophy, and the culture result is positive. The second, or nasal, type shows a bloody purulent anterior nasal discharge, usually unilateral, with excoriation of the upper lip and neighboring skin. One class gives a history of a diphtheritic attack with epistaxis in its course or during convalescence, the characteristic discharge appearing a few weeks after the attack. In the other class the patient shows the lesion without having had the disease. In his first year's campaign he followed the prevalent practice of depending on the laboratory test at first. He found reason to regard inspection of the nose as less misleading than culture data. In the second year, therefore, he gave more prominence to field work and relied mainly on it. No contacts were isolated if the nasopharynx was normal, and the quarantine was raised. He had no reason to regret this course. The results were that following this method cases of diphtheria very markedly decreased in number. To secure still further control, recurring inspection by field nurses of children under school age in families with no school absentees is needed, together with the notification to the board of health of the arrival of new families in the community. "In the control of diph-

theria, the field work of the epidemiologist plays the most important rôle. The means by which he operates are the physical examination of patients and contacts, the subsequent careful supervision of the former at the time of head colds and sore throats, and the constant family and neighborhood survey for carriers."

✱

"The Same Old Story."—The *Toledo City Journal* for May 6, 1916, contains a review of the health situation which should move our sympathy and yet has a touch of the humorous in it. Says the Commissioner dolefully:

"This is an obituary. This is the last word of the last gasp of a dying ambition.

"One month ago the Division of Health felt the stimulus of enthusiasm and opportunity. A sincere desire to do something for the community was the source of our enthusiasm. All of Toledo was our opportunity. The prevention of disease and death was to be our reward.

"We went before the Council and told them what we needed—money. They gave to us some, but it was not enough and it was all they could give.

"We went to the people. We asked them to support the bond issue. We felt that they would vote the money in order that the Division of Health might live, if for no other reason. They refused, and now we have no money. We must cease all work, except such as might pertain to the prevention of epidemics. We have been compelled to discharge our sanitary force and our welfare nurses. We have been compelled to curtail the service we should give to the sick poor. We have no funds with which to give hospital care to those who cannot buy it for themselves.

"We know that our appeal for help in homes of the unfortunate will ring to the heavens, but we cannot respond. We shall be criticised, and though our hearts will ache, we cannot do anything. In this great, rich city we languish for lack of sustenance; we starve for money. Where will it end? Is there no help? Where are the citizens who are back of the health movement in Toledo?"

✱

The Negro Menace to the Public Health.—In the May issue of the *Southern Medical Journal* appears a remarkable article on the health phase of the "Negro Question." Figures

indicate that in the south the death-rate is three to four times greater among the negro than among the white population. The extreme danger from infection through the employment of these people is obvious and Doctor Graves points out four lines along which the most progress can probably be made in the improvement of these conditions:

1. The enactment of proper housing laws, ordinances and regulations governing buildings, sewerage, drainage, water supply, ventilation and sanitation.

2. *Education for Both Whites and Blacks.*—

(a) The inauguration of public health and preventive medicine courses in every medical college of importance throughout the country, so that an educated and trained body of sanitarians may be supplied to states and counties and cities for their health officers.

(b) The organization of efficient state, county and municipal health departments, with every modern laboratory equipment and with well trained, well paid and fulltime health officers in charge of same, not subject to political removal.

(c) The enlargement and encouragement of the educational efforts of the institutions of the colored people throughout the country, such as Tuskegee, Hampton, Wilberforce, Paul Quinn, Straight and Southern Universities, etc.

(d) The public schools, with the active assistance and direction of the school physicians and the teachers, may be made a most useful agent in the dissemination of health education.

(e) Collaboration with churches and social welfare workers everywhere in the newer movements looking to the welfare of the race.

3. *Certain social and legal restrictions* which have a political bearing, and which may become subjects of heated discussion, must be mentioned, although they may arouse divergent views among high-minded and well disposed individuals.

4. And finally, public clinics should be provided in all our municipalities large enough to bear the expense for medical, surgical and dental service to the poor and ignorant.

✱

"Sanitary Homes Reduce Morbidity.—Plans have been completed for the erection of a series of model homes in the city of Washington for the purpose of demonstrating to the nation the

relationship between good housing and good health. These are to be known as the Ellen Wilson homes, and are not in the nature of an experiment, but are intended as a demonstration to the entire United States.

"The intimate connection between bad housing and bad health and good housing and good health is clearly recognized in Washington, where the alley dwellings have long been a matter of concern both to the health authorities and to public spirited citizens who wish the Capitol city to be an example to the nation. The alleys have been paved, sewers and water mains have been laid, they are lighted and cleaned as are the streets. Yet they keep their old lead over the streets when it comes to totalizing the figures for disease and death.

"In this, Washington's experience has been like that of Liverpool and other European cities, which tried unsuccessfully to make badly situated dwellings wholesome by cleaning and fumigating. After thirty-three years of unavailing effort to improve that which was fundamentally bad, Liverpool finally decided that the only hope lay in wiping out its insanitary areas. It demolished the old houses by the acre and in place of them built new houses. Where dwellings have been crowded so close together that there was scarcely passage room for a stout man to squeeze his way to one of the old rear houses, it built new dwellings opening upon wide spaces which provided light and air. Immediately sickness and death decreased—and with them vice and crime. What had seemed a hopeless struggle for more than a generation was won.

"Other cities in Europe have done the same and with the same results, but what makes Liverpool's figures of unusual value is that the new houses are occupied by the same people who occupied the old ones. In some cases the population on a given area in the new dwellings is 99 per cent., the same as that which lived on the area in the old buildings. So here the effect of housing is not complicated by questions of different occupants, of better food or clothing, or a generally higher standard of living. The housing only has been changed and the results are striking.

"Washington is attempting much the same work, though in a less dramatic manner. Congress has enacted a law which goes into effect

on July 1, 1918, according to which all the alley dwellings in the District of Columbia must cease to be used for dwelling purposes. Meanwhile, in order that there may be accommodation for those who will be forced to seek new homes in street houses, there has been organized a limited dividend company which is to build houses that will be not only sanitary and provide an abundance of light and air, but houses attractive architecturally, homelike in their arrangements, and containing bathrooms and provision for hot water in place of the old outdoor closets and hydrants.

"Such houses as these cannot, of course, yield the return upon the investment that the old houses did. In fact, Congress, in its act incorporating the Ellen Wilson homes, limited its dividends to 5 per cent. net. But they will yield to their stockholders a dividend in the form of satisfaction because of a needed work well done. To their tenants they will give relief from preventable sickness and death and an increase in the joy of living."—*New York Medical Journal*, May 6, 1916.

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Finger Nail Deposits.—The significance of finger nail deposits in forensic medicine and in public and personal hygiene is pointed out by Albert Schneider, San Francisco (*Journal A. M. A.*, May 20, 1916), with the importance of their microscopic examination. This form of examination has been particularly applied to a number of criminal cases in this country and in Europe but has not been adopted as yet as an officially recognized routine. The possibilities of this examination became apparent to him over twenty-five years ago when incidentally examining the scrapings from his own finger nails and those of his laboratory assistants, the number and variety of substances found was astonishing. The method was first put in as a diversion in the laboratory work, but has since become a routine measure. The findings gave evidence of the routine labors engaged in for periods of from one to eight days previous, and of personal habits, kind and quality of clothing worn, business occupations, etc. The possible value of the method in detective work, in examination of spy suspects in war, suggested itself in making microscopic examinations of the nail deposits of persons who are traveling and who have been on journeys, or

special errands or missions. It was found that there is a very notable difference in the deposits of the nails of the right and left hand and also of the nails and fingers and thumbs of the same hand. The ordinary method of cleaning the hands, inclusive of the usual nail cleaning, does not materially alter the microscopic findings and even the vigorous use of the nail brush does not result in the removal of the deposits. Close trimming of the finger nails is far more effective, but this practice is rare. The bacteriologic findings are very interesting. The streptococcus apparently predominates in most cases, rather than the staphylococcus or the colon bacillus group, as one might reasonably expect. In 143 cases examined the order of predominance was as follows: "1. Streptococcus group, the acid fast varieties predominating. 2. Staphylococcus group. 3. *Bacillus coli* group, almost invariably present. 4. Bacilli, cocci and spirillæ probably derived from mouth, soil, food, water, body surface, nose, eyes, sewage, dust, dirt, etc. 5. Occasional yeast cells, spores and filaments of higher fungi. 6. Larvæ of vermes; occasional amebas; diatoms, algæ; etc." He gives instances of the value of such investigations and an outline of how they should be carried on. Thus far the medical profession has given but little attention to the part played by the finger nail deposits in infection. That there is danger in the hand shake is generally recognized, but it still holds its popularity. The finger nail deposits are the chief source of danger in the hand shake, and Schneider enumerates the principal methods of infection: 1. Autoinfections. Many skin diseases are traceable to scratching, particularly in persons with low opsonic indexes to the causative infections. 2. Heteroinfections, which can be transmitted this way and no lengthy argumentation is needed to prove that there is danger. Much valuable information can be obtained by such microscopic examinations.



Sanitary Condition of Bottled Waters.—The Bureau of Chemistry for several years has been investigating the sanitary conditions in the production and distribution of bottled mineral and table waters, which are offered for sale in interstate commerce and therefore subject to the Food and Drugs Act. It is recognized that the sale of bottled waters is dependent largely

upon the belief by the public in the purity of the product. The Bureau has recently conferred with a large number of sanitary experts and bacteriologists regarding a desirable standard for judging the sanitary character of bottled waters. As a result of the investigational work and the above mentioned conferences, the Bureau believes that the tolerances established by the Public Health Service of the Treasury Department for waters served on interstate carriers is none too rigid for application to bottled waters sold in interstate commerce or imported from foreign countries. The Treasury Department standards are as follows:

1. The total number of bacteria developing on standard agar plates, incubated 24 hours at 37°C., shall not exceed 100 per cubic centimeter; provided, that the estimate shall be made from not less than two plates, showing such numbers and distribution of colonies as to indicate that the estimate is reliable and accurate.

2. Not more than one out of five 10 cc. portions of any sample examined shall show (by the method of the Public Health Service) the presence of organisms of the bacillus coli group.



Life Tables of the Census Bureau.—The Bureau of the Census, Department of Commerce, is soon to issue a unique set of tables, the first of their kind which have ever been prepared by the United States Government. These tables, which were compiled under the supervision of Professor James W. Glover, of the University of Michigan, show death-rates and expectation of life at all ages for the population of the six New England states, New York, New Jersey, Indiana, Michigan, and the District of Columbia (the original death-registration states) on the basis of the population in 1910 and the mortality for the three years 1909, 1910, and 1911.

According to these tables the average expectation of life, at birth, for males is 49.9 years; for females, 53.2 years. The expectation of life at the age of 1 is considerably greater than at birth, being 56.8 years for native white males and 59.5 for native white females, and reaches its maximum at the age of 2, when it is 57.5 for the former class and 60.1 for the latter. At the age of 12 the average native white male's expectation of life is 50.2 years; at 25 it is 39.4

years; at 40, 28.3 years; at 50, 21.2 years; at 60, 14.6 years; at 70, 9.1 years; and at 80, 5.2 years. Similarly, at the age of 12 the average native white female's expectation of life is 52.6 years; at 25 it is 41.8 years; at 40, 30.3 years; at 50, 22.8 years; at 60, 15.8 years; at 70, 9.8 years; and at 80, 5.5 years. A part of the difference between expectation of life for men and for women is due to the greater number of violent deaths among men.

The enormous waste of infant life which still goes on, although medical science has done and is doing much to arrest it, is shown by the exceedingly high death-rates which prevail among infants under 1 year of age. Of 100,000 native white boy babies born alive, 4,975, or almost 5 per cent., die during the first month, and 12,602, or 12.6 per cent., die within one year. The girl baby's chance of life is considerably better, the death-rate among native white females during the first month being 3,894 per 100,000 born alive, or less than 4 per cent., and

during the first year 10,460 per 100,000, or nearly 10.5 per cent.

The relative healthfulness of city and country is strikingly shown by the tables, according to which the death-rate among white males under 1 year of age in cities having 8,000 inhabitants and over is 13,380 per 100,000 born alive, whereas in smaller places the corresponding rate is 23 per cent. less than the rate for cities. A similar difference prevails with respect to white females under 1 year of age.

For white males the expectation of life, at birth, in rural localities is 7.7 years greater than in cities; and until the age of 39 is reached there is a margin of more than five years in favor of the country. Thereafter the difference becomes gradually less, until the age of 88 is reached, at and after which the cities show a slightly greater longevity than the rural localities. For white females the difference between urban and rural longevity, while pronounced, is somewhat less than in the case of males.

Industrial Hygiene and Sanitation.

Machinery and Accidents.—An impressive circular in the interest of decreasing factory accidents has been issued by the state industrial commission of New York. The state now has an accident compensation law similar to that in force in Massachusetts, but the law can avail little in the way of prevention until the factory management becomes thoroughly alive to its responsibility in the matter of safeguarding life. Competent factory inspection is a factor in this arousing, but such facts and figures as are here must have an educational influence among thinking men.

In the four years previous to the passage of the law a factory worker in the state was killed at his work through a machinery accident every two and three-quarters working days. A man was crippled every three and a half days, not including the nearly five a day who lost fingers or toes. The economic loss, moreover, is a tremendous affair. In the single year of 1913, the 4,177 accidents connected with machinery that would have been compensable under the working of such a law as now exists would have entailed an economic loss, reckoned only on the basis of

two thirds of the wage loss, of nine hundred thousand dollars.

The commission is emphatic in its warning and finds that three fourths of all accidents are connected with working machines, one eighth with conveying or hoisting machines, and one tenth with power transmitting machines. But of fatal accidents, which represent the extreme of seriousness, one half are connected with conveying and hoisting machinery, one fourth with power transmitting machinery, and one fourth with working machines. Or, comparing fatal with all accidents, it is found that among accidents connected with hoisting machinery, one in forty-five is fatal, power transmitting machinery, one in sixty-eight, and working machines, one in five hundred and seventy-eight.

✱

Social Insurance.—The Legislature of Massachusetts has passed a resolve creating a recess committee to investigate the question of social insurance. This question involves the taking of prevention measures by the state against ill health and death among the workers of the commonwealth and involves a study of sickness

in its relation to the increased cost of living by reducing the production power of labor.

In Germany, where the principles of social insurance were first given practical demonstration, certain benefits have resulted which seem to make it worth while to determine whether or not at least some modification of these principles may not be successfully tried out this side of the water.

The report of the Massachusetts Committee will be awaited with great interest.

✱

Voluntary Increase in Wages.—Notice has been posted in the Willys-Overland automobile factory that wages of all employees will be increased voluntarily June 1. It will benefit seventeen thousand employees, and the company announcement says the annual payroll will be \$14,300,000.

All employees receiving twenty-five cents or less an hour will be advanced 10 per cent.; between twenty-five and thirty cents, 7 per cent., and more than thirty cents, 4 per cent. In addition the number of weekly working hours is decreased from fifty to forty-eight, with pay for fifty hours.

✱

"Safety First" at the Ford Plant.—The Ford Company has just put into circulation among the moving picture theatres of the country a new film called "Safety First." This film shows in actual operation all the mechanical safeguards that have been installed in the Ford Factory for "Safety First" and to protect the lives and limbs of the 29,000 Ford employees.

✱

Safety in Industries.—As an outgrowth of the industrial casualty prevention conference held in Harrisburg in March, the governor has appointed a state safety board consisting of the heads of the state departments. They will organize and select a working committee of men under them who will formulate a practical plan that will be put into effect through the various branches of the state government. This will be to formulate regulations that will seek to guard against casualties of all kinds, and by promoting individual example do much toward bringing about the adoption of practical safety in industries throughout the commonwealth by making care automatic.

It is recognized that, owing to carelessness or

inefficiency, or possibly to the absence of safety devices, there are annually in the state an overwhelming number of casualties, hundreds of them fatal and others that result in the maiming and permanent injury of thousands of men and women. It is contended that the majority of these mishaps could have been prevented had the individual involved exercised proper care or had the industry where he or she worked provided the necessary safety appliances.

According to information from the commissioner of the department of labor and industry, the report of the first two months of this year indicated that if the same ratio is kept up for the remaining ten months there will be mishaps to 300,000 workmen in the state, of which 2,500 will be fatal.

✱

Benzol.—There has recently been reported, from an industry in which benzol is used, two deaths, supposed to be due to this substance. While it is believed that these deaths may have been due to certain toxic substances often present in impure benzol, the pure article is sufficiently dangerous to warrant a caution in its use. Benzol is a highly inflammable fluid obtained from the distillation of coal tar, and serves as the raw material for making phenol, picric acid and other substances in the arts, and also as a solvent for crude rubber. Besides being highly inflammable, it has marked toxic qualities and while usually its use does not give fatal results it may produce serious symptoms, or even result in death.

Acute benzol poisoning is caused by breathing benzol in the absence of adequate ventilation and is accompanied by symptoms of extreme prostration with a cyanosis due to the destruction of the red blood corpuscles.

Benzol should be used only where good conditions of ventilation prevail and its toxic properties should be fully recognized by those who use the substance in manufacturing processes or elsewhere.

✱

Lead Paints in England.—The enactment of a law prohibiting the importation, sale or use of any paint material containing more than 5 per cent. of its dry weight of a soluble lead compound was recommended by the British Departmental Committee appointed to investigate the danger

of the use of paints containing lead to the health of persons engaged in painting buildings.

To give adequate time for paintmakers and others to arrange for supplies of nonpoisonous materials and also to facilitate the introduction of modifications in painting methods, where special work necessitates such changes, the committee recommends that the restriction of the amount of lead in paints to not more than 5 per cent. of soluble lead should not be enforced until three years after the publication of its report.

The appointment of a committee was prompted by the numerous cases of lead poisoning among painters, and the belief that many of them could be prevented by the same careful regulation or restriction which has proved effective in reducing the number of cases of lead poisoning in factories by more than one-half since 1900.

It is stated that about thirty deaths are reported each year in England and Wales from lead poisoning among house painters. The number of non-fatal cases is estimated at about seven hundred and fifty per annum.

The recommendations of the committee are signed by seven of its eight members, one a representative of the Association of Master Painters, submitting a minority report. This minority report vigorously challenges the conclusions and regulations of the other members of the committee and urges that regulation should at least be given a thorough trial before prohibiting the use of so valuable a paint material as white lead. This recommendation is based upon the claim that the center of danger in all industries is the dust produced, and that in painting the dust producing processes harmful to the health of the workers rest on the dry rubbing of the lead paint. Therefore, it is suggested that the rational course is to prohibit under heavy penalties the practice of dry rubbing down and thus remove the great source of danger from poisoning from lead dust.

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The Forty-third Annual National Conference of Charities and Correction which convened this month in Indianapolis had the largest attendance in the history of the conference, more than 3,100 delegates being registered.

The conference gave a considerable amount of its time to the discussion of social insurance.

The large proportion of poverty due to disease

was emphasized by I. M. Rubinow in sketching a plan for health insurance. Doctor Rubinow pointed out that at present the rich can afford to provide specialists and the poor are treated in dispensaries and free clinics, but the mass of American wage-earners are unable to pay for the one and do not wish to take advantage of the other. Doctor Rubinow pointed out the effect health insurance would have in improving the quality of medical service rendered the community.

*

The Common Drinking Cup and Towel in Massachusetts.—At a meeting of the Massachusetts State Department of Health held on March 22, the common use of drinking cups and towels in factories was unlawful.

The term "common drinking cup" is construed to mean any vessel or utensil used for conveying water to the mouth and available for common use by the public. By "common towel" is meant a roller towel or a towel available for use by more than one person without being washed after such use.

*

Health of Munition Workers.—The health of munition workers committee, which was appointed in September, 1915, "to consider and advise on questions of industrial fatigue, hours of labor, and other matters affecting the physical health and physical efficiency of workers in munition factories and workshops," in November and December, 1915, submitted three interim reports on special phases of their work, including Sunday labor, welfare supervision, and industrial canteens. Evidence was taken in London and other important centers from employers, representatives of workers, and other interested persons, and a large number of factories and workshops situated in different parts of the country was visited by one or more members of the committee.

In its study of welfare supervision among munition workers, the committee found that "almost more important than the immediate or technical environment in which work is carried on and the length of hours during which the workers are employed," are four chief influences which affect industrial efficiency, namely, questions of housing, transit, canteen provision, and individual welfare of the employees.

Based upon the proposition that productive

output in regard to quality, amount, and speed is largely dependent upon the physical efficiency and health of the workers, which in turn is dependent upon nutrition, and that a dietary containing a sufficient proportion and quantity of nutritive material, suitably mixed, easily digestible, and obtainable at a reasonable cost is essential, the committee expresses the conviction that "in the highest interest of both employer and worker, proper facilities for adequate feeding arrangements should be available in or near, and should form an integral part of, the equipment of all modern factories and workshops." Many employers, it is pointed out, have established industrial canteens, and this practice "has abundantly justified itself from a business and commercial point of view," and in the opinion of the committee "the time has come for a large extension of this method of solving the problem" of supplying suitable food at a low price for a large number of persons for specified times. Speaking generally, the accommodation provided accords with one or other of the following types:

An available room for the workers to eat their prepared food;

(2) A room furnished with a "hot plate" or "warming cupboard" or provided with hot water;

(3) A refreshment barrow to perambulate the workshops at appointed hours (particularly useful for light refreshments during long spells of night shifts);

(4) A fixed refreshment bar or buffet;

(5) A dining room supplying hot and cold dinners;

(6) And such dining room associated with an institute or club with facilities for rest and recreation.

In order to insure effective results of the establishment of industrial canteens, certain essential conditions are suggested and outlined, including accessibility and attractiveness, form, construction, and equipment, food and dietaries with suggested prices, prompt service, convenient hours, methods of payment for meals, and management.

The report indicates that substantial advantages, both to employers and employees, have followed the establishment of effective and well managed canteens. Marked improvement in the health and physical condition of workers, a

reduction of sickness, less absence and broken time, less tendency to alcoholism, an increased efficiency and output, a saving of time of the workmen, greater contentment, and better midday ventilation of the workshops are some of the benefits noted.

✱

Dusty Occupations.—V. C. Baker, New York (*Journal A. M. A.*, May 6, 1916), has investigated the influence of dusty occupations in the production of disease among the patients examined at the Cornell University College dispensary. The diseases investigated were those observed in furriers, of whom there were sixty-nine applying for treatment, mostly natives of Russia and Austria Hungary. There were few hatters and they are not considered in the statistics, though they are liable to injury from dust and from the use of mercuric nitrate. Most of the workers were young adults, only twelve being over 40 years old. The respiratory tract is most frequently involved. There were nine patients with pulmonary tuberculosis, twelve with chronic bronchitis, ten with emphysema, and two with bronchial asthma. Of the latter two, one attributed his trouble to the anilin dyes used. The occupation of barber is not usually considered a dusty one, and but 110 were examined. There were forty-five patients with respiratory disease and thirty-one with alimentary tract disorders. The dust cannot be blamed for this, but the occupation causes fatigue from long standing on the feet and thus affects normal alimentary processes. One hundred and thirty bakers were examined. The occupation has long been considered insanitary, but has been much improved by regulation. The chief hazards are exposure to excessive heat and flour dust. Fifty-four showed signs of respiratory disease, and thirty-one patients alimentary diseases. Seventeen had gastric disturbances, probably due to overindulgence in their own wares, and there was also present the more or less constant use of alcohol. In the manufacture of tobacco, cigars and cigarettes a certain amount of dust is produced—plenty in the work of the strippers and tobacco handlers. In the manufacture of cigars there are few moist leaves used, and the atmosphere contains fine particles of tobacco with its nicotin and volatile oil and other extraneous matters. Ninety-two of the workers examined were cigar makers, nineteen cigarette-

makers, and fourteen tobacco handlers. There were thirty-eight patients with respiratory diseases, thirty with alimentary complaints, chiefly chronic gastritis and constipation, and twenty-five with nervous diseases, including headaches and neurasthenia. There was one patient with acute nicotin poisoning and one with tachycardia. Nineteen marble workers were examined, eight suffering from respiratory diseases. Most of the stone cutting is done outdoors in large airy sheds, and pneumatic tools are used to a considerable extent nowadays. These tools stir up much dust, which is increased by the use of air pressure to keep the cutting surface clear. Thirty-seven cases were encountered, in twelve of which the patients suffered from respiratory diseases. Although only one case of chalicosis was recorded, a greater number would probably have been noted if other factors were studied as closely as physical signs. Thirty-six plasterers were examined, and the respiratory tracts were found largely involved. Admitting dust to be the important causative factor, Baker recommends the following methods of meeting it: In the fur trade one of the worst processes is beating. This should be done in a separate room with proper means of removing the dust from the atmosphere. It should not be allowed

to accumulate. Sweeping should be done after hours with vacuum cleaner or dampened floors. Respirators should be worn wherever dust is prevalent. Among the barbers, hairs should not be allowed to remain on the floors, and ventilating fans and currents should be directed so as not to disturb them. Special care should be observed in bakeries against raising dust, and where there is dust, proper protectors to the nose and mouth should be used. The tobacco workers should not allow scrap to accumulate, and the already mentioned methods of ventilating and sweeping should be employed. In marble work, stone cutting and plastering, the fine material should be removed as soon as possible, and procedures involving dust production should be curtailed as much as possible. Respirators are called for where dust is unavoidable. Other general cautions in the dusty trades are instruction of the workers as to the risk, frequent physical examinations, fresh air and cleanliness in the home and the encouragement of exercise. The workroom should not be overcrowded or littered, and light and ventilation should be properly provided for. The high percentage of respiratory diseases in certain trades is due to the exposure to dust which prepares the lungs to receive infection.

Personal Notes

At the annual meeting of the National Conference of Charities and Corrections held in Indianapolis, May 6-19, Mr. F. A. Almy, secretary of the Charity Organization Society of Buffalo, was elected president for the coming year.

*

Dr. W. S. Rankin was elected vice-president of the National Tuberculosis Association at its annual meeting held in Washington, D. C., May 9-12.

*

At the thirty-first annual meeting of the Conference of State and Provincial Boards of Health held in Washington, D. C., on May 16, Dr. T. D. Tuttle, Commissioner of Health of the State of Washington, was elected president; Dr. Samuel L. Jepson, commissioner of health of the State of West Virginia, was elected vice-

president; and Dr. Eugene R. Kelly, Chief of the Division of Communicable Disease of the Massachusetts Department of Health, was elected secretary.

*

Dr. William C. Woodward, Commissioner of Health of Washington, D. C., at the annual meeting of the Medical Jurisprudence Association held at Washington, D. C., on May 6, was elected councilor for the term ending 1921.

*

Dr. Lewis Fish has resigned as district state health officer of the Massachusetts State Health Department.

*

Dr. Thomas Tetrau, formerly health officer of North Yakima, Wash., has been appointed health officer of Portland, Maine.

Dr. Burdett L. Arms, formerly Professor of Preventive Medicine, at the University of Texas, has been appointed Director of the bacteriological laboratory of the Alabama State Board of Health at Montgomery.

✱

Mr. J. L. Tobey has been elected assistant health officer of Summit, N. J.

✱

Mr. R. N. Hoyt has been appointed health officer of Manchester, N. H., and Mr. Henry Berger has been appointed to succeed him as director of the Coöperating Boards of Health at Wellesley, Mass.

✱

Mr. Carl E. Buck has been appointed commissioner of health of Oak Park, Ill.

✱

Dr. John R. McDill of Milwaukee has been selected as surgeon in chief of two field hospitals of 500 beds each, to be established in Germany and Austria by the American Surgeons' Expeditionary Committee.

✱

The following persons were elected to membership in the American Public Health Association:

Austin U. Simpson, M. D., Seattle, Wash., City Bacteriologist.

A. C. Bachmeyer, M. D., Cincinnati, Ohio, Superintendent Cincinnati General Hospital.

Harlow O. Caswell, Ft. Atkinson, Wis., Physician and Surgeon.

Helen M. Scheller, Little Rapids, Wis., Supt. Brown County Sanatorium.

Royal Knight Joslin, Providence, R. I., Medical Student, Tufts.

Mildred H. Lucia, R. N., Eau Claire, Wis., Supt. Mt. Washington, Eau Claire County Tubercular Sanatorium.

John Rich McDill, M. D., Milwaukee, Wis., Surgeon.

John C. App, Charleston, W. Va., City Chemist and Bacteriologist.

Walter A. Reilly, Naugatuck, Conn., Physician and Local Health Officer.

R. W. Showalter, Indianapolis, Ind., Director, Biological Dept., Eli Lilly Co.

Charles C. Benedict, M. D., Anchorage, Alaska, Physician.

Albert A. Pastene, M. D., Chester, Mont., Physician and Health Officer.

Alec Nicol Thomson, M. D., New York City, Brooklyn Hospital.

Current Public Health Literature.

AMERICAN.

Albany Medical Annals.

XXXVII. May.

Report of the Health Director of the Albany Public Schools. Clinton P. McCord.

American Journal of Clinical Medicine, Chicago.

MCMXVI. May.

Recreations for the Aged. I. L. Nascher.

American Journal of Sociology, Chicago.

XXI. May.

Fifty Years of Sociology in the United States, 1865-1915. Abbion W. Small.

American Medicine.

XXII. April.

Some Important Events in the Development of Medicine in America. R. I. Geare.

American Journal of Tropical Diseases and Preventive Medicine, New Orleans.

III. May.

One Hundred Cases of Malaria Treated by Intravenous Mercuric Chloride, and the Possibility of Its Use in a General Anti-Malarial Campaign. Part II. Nathan Barlow.

The Mosquitoes of Mecklenburg County, N. C. H. P. Barret.

Mycetoma in Western Panama. W. T. Burres.

Intestinal Bilharziosis in Western Panama. W. T. Burres.

Boston Medical and Surgical Journal.

CLXXIV. May 11.

The Fallacies of Group Treatment. H. J. Cronin.

May 18.

How the State Provides for Its Mentally Ill. L. Vernon Briggs.

June 1.

Five Years' Progress in the Diagnosis and Treatment of Consumption by Massachusetts Physicians. John B. Hawes, 2d.

B. Dysenteric as a Cause of Infectious Diarrhea in Infants. Carl Ten Broeck, F. G. Norbury.

Canadian Public Health Journal, Toronto.

VII. May.

Social Service and Hospital Efficiency. H. R. Y. Reid. The Feeble-Minded and the Public Schools. Chas. G. Frazer.

Journal of the American Medical Association, Chicago.

LXVI. April 29.

The Value of Health Examinations. H. J. Cronin. The Laboratory Examination of Material in a Case of Suspected Smallpox. J. N. Force.

A Simple Method of Quantitative Determination of Complement Fixation. I. O. Herschfelder.

May 6.

Syphilis and Life Insurance, with Special Reference to the Wassermann and Luetin Reactions. J. A. Kolmer.

Industrial Anilin Poisoning in the United States. R. V. Luce.

An Outbreak of Typhoid Attributed to Infected Oysters. P. B. Brooks.

Further Observations on the Schick Test for Diphtheria Immunity. G. H. Weaver.

Dusty Occupations. Valentine C. Baker.

May 13.

Control of Diphtheria. D. M. Lewis.

May 20.

Vaccine Treatment. Ludvig Hektoen.

Streptothrix in Broncho-pneumonia of Rats Similar to that in Rat-Bite Fever: A Preliminary Report. Ruth Tunnick.

The Bacillus Epilepticus. Third Report. C. A. Reid.

The Microscopic Examination of Finger Nail Deposits; Significance in Forensic Medicine and in Public and Personal Hygiene. Albert Schneider.

The Pseudoreaction of the Schick Test. A Zingher.

May 27.

A Study of 1,153 Cases of Scarlet Fever, with Special Reference to their Sequelae. Louis I. Dublin.

The Municipal Hospital as a Factor in Clinical Teaching. H. W. Loeb.

The Duration of the Nursing Period in Women of the United States. A. G. Mitchell.

The Etiology of Typhus Fever in Mexico. P. K. Olitsky, B. S. Dinzer, C. E. Husk.

Notes on Grip Epidemic in Chicago. A. M. Moody, J. A. Clapps.

Journal of the American Water Works Association, Baltimore.

III, No. 2. June.

The Typhoid Toll. George A. Johnson.

The Latest Method of Sewage Treatment. Edward Bartow.

The Water Supplies of Interstate Common Carriers on the Great Lakes. H. P. Letton.

The Bubbly Creek Water Softening Plant. C. A. Jennings.

Pressure Filters. Harold C. Stevens.

Further Development of Iron Removal Plant and Storage. F. C. Amsbury.

Erosion of Watersheds and Its Prevention. Benjamin Brooks.

Water Softening by Filtration through Artificial Zeolite. D. D. Jackson.

Difficulties in the Designing and Operation of Medium Sized Water Works Plants. E. B. Black.

Some Aspects of Chlorination. Joseph Race.

Tropical Water Supplies with Special Reference to the Canal Zone and to Vera Cruz, Mexico. James T. B. Bowles.

Journal of Bacteriology, Baltimore.

I. March.

Preliminary Report on Synthetic Media. C. J. T. Doryland.

The Significance of the Voges-Proskauer Reaction. Max Levine.

Are Spore-forming Bacteria of Any Significance in Soil under Normal Conditions. H. J. Conn.

A Possible Function of Actinomycetes in Soil. H. J. Conn.

A Species of Alcohol-Forming Bacteria Isolated from the Interior of Stalks of Sugar Cane Infested with the Cane-borer *Diatrea saccharalis*. W. L. Owen.

Journal of Experimental Medicine, Baltimore.

XXVIII. June 1.

Experiments on the Development of Malarial Parasites in Three American Species of Anopheles. W. V. King.

Bacteriological and Experimental Studies on Gastric Ulcer. H. C. Celler, Wm. Thalheimer.

Journal of Infectious Diseases, Chicago.

The Bacteria of Milk Freshly Drawn from Normal Udders. Alice C. Evans.

The Etiology and Experimental Production of Herpes Zoster. E. C. Rosenow, Sverre Aftedal.

The Epidemiology of Pellagra in Nashville, Tenn.

Journal of Laboratory and Clinical Medicine, St. Louis.

I, No. 8. May.

Specific Parenteral Digestion and Its Relation to the Phenomena of Immunity and Anaphylaxis. J. Bronfenbrenner.

The Serotoxin of Jobling. N. R. Smith.

Newer Laboratory Methods for the Early Diagnosis of Pulmonary Tuberculosis. Morris H. Kahn.

Journal of the Outdoor Life, New York.

XIII. June.

The Diagnostic Function of the Tuberculosis Dispensary. F. Elisabeth Crowell.

The Dispensary as a Bureau for the Admission of Tuberculosis Patients to Hospitals and Sanatoria. Karl Schaffie.

Tuberculosis Dispensaries in Massachusetts. Eugene R. Kelly.

Medical Times, New York.

XLIV. June.

The Pharmacology of Alcohol. H. W. Wiley.

Factory Legislation—Its Medical Aspect. Abram I. Elkus.

The Pathology of Syphilis. F. E. Gardner.

The Dietetics of Efficiency after 40. Louis Faugeres.

Modern Hospital, St. Louis.

VI. June.

Heating Systems for Hospitals of Various Sizes. Frank Sutton.

Municipal Receiving Hospital for Detroit, Mich. John Scott.

The Small Community Hospital—Its Creation. J. A. Hornsby.

Compulsory State-Wide Health Insurance and Its Relation to the Medical Service. E. R. Hayhurst.

Vast Welfare Activities Under Way. L. A. Coolidge.

The Convalescent Field—Its New and Changing Border Lines. Frederick Brush.

New York Medical Journal.

CIII. April 29.

Teacher's Vitality as Indicated by the Ptois Test. I. H. Goldberger.

May 13.

The Immune Response in Pulmonary Tuberculosis. Ellis Bonime.

May 20.

Specific Therapy in Certain Acute Infectious Diseases. F. J. Dever.

Concealed Measles. Ralph Opdyke.

New York State Journal of Medicine.

16. May.

Will the Private Practitioner Determine the Future of Public Health Work. Haven Emerson.

The Treatment of General Infections by Sera and Vaccines. A. MacFarlane.

Syphilis as an Etiological Factor in Epilepsy. W. T. Shanahan.

Nurse, The, Jamestown, N. Y.

IV. June.

The Psychology of Nursing. James F. Rogers.

The Nurse and the Mental Patient: II. Anne E. Perkins.

The Role of the Visiting Nurse: VI. The Industrial Nurse. Stella Fuller.

Southern Medical Journal, Birmingham.

IX. May.

- The Negro a Menace to the Health of the White Race. Marvin L. Graves.
A Plea for a National Committee on the Eradication of Malaria. F. J. Hoffman.

The Trained Nurse, New York.

LVI. June.

- Relaxation vs. Christian Science. Annette Fiske.
Practical Points in Mental Nursing for the General Nurse. Harry W. Keatley.
The Protective Treatment against Typhoid Fever. Stephen Paget.

United States Public Health Reports.

XXXI. April 28.

- Some Fallacies Regarding Phenol. Martin I. Wibert.
May 5.
Smallpox in Germany (Abstracted from Medizinisch-Statistische Mitteilungen aus dem Kaiserlichen Gesundheitsamte).
May 12.
Tertian Malarial Fever. M. Bruin Mitzmain.
May 19.
The Control of Mosquitoes.
Pellagra. J. R. Ridlon.
May 26.
The Division of Domestic Quarantine. W. C. Rucker.
Health of Garment Workers. The Relation of Economic Status to Health. B. S. Warren, Edgar Sydenstricker.

FOREIGN.

BRITISH EMPIRE.

British Journal of Tuberculosis, London.

X. April.

- Crippled Tuberculous Children. H. J. Gauvain.
Infection in Tuberculosis. T. Shennan.
Examination of Contacts at Tuberculosis Dispensary. N. Robertson.
Bedroom of Consumptive.

British Medical Journal, London.

No. 2887. April 29.

- Method of Preparation of Nontoxic Dysentery Vaccine. H. R. Dean, R. S. Adamson.
New Apparatus for Bacterial Fermentation Tests; Fermentation Bulbs. S. Delepine.

Journal of State Medicine, London.

XXIV. May.

- The Sexual Disease Campaign.
Royal Commission on Venereal Diseases, 1916.
Powers and Duties of Local Authorities with Regard to the Housing Question. Sir Thomas Hunter.
Sanitary Progress in British Guiana. K. S. Wise, E. P. Minett.

Lancet, London.

No. 4831. April 1.

- Investigation of Strains of Tubercle Bacilli Derived from Sputum. A. S. Griffith.
Food Economics in Relation to the War. H. Campbell.

April 8.

- Use of Stock Vaccine for Infection of Bacillus Typhosus. T. H. Whittington.
Agglutination Tests in Inoculated Persons, and Influence of Fibrile Condition on Inoculation Agglutinins. Dreyer, Gibson and Walker.
New Apparatus for Isolation and Cultivation of Anaerobic Microorganisms. J. McIntosh and P. Fildes.

April 15.

- Acute Poliomyelitis. F. E. Batten.
Standard Method for Testing Antiseptics for Wounds, with Some Results. W. d'E. Emery.

April 22.

- Infantile Mortality and Relative Practical Value of Measures Directed to Its Prevention. S. G. Moore.
Preparation and Use of Certain Agglutinating Serums. H. Chick.

Medical Officer, London.

XV. April 22.

- Health and Housing. A. K. Chalmers.

April 29.

- Typhoid Fever in London.
Health and Housing. A. K. Chalmers.
May 6.
Health and Housing. Concluded. A. K. Chalmers.
May 13.
Sale of Milk Regulations.
Administration of the Sale of Food and Drugs Acts, as Affecting Milk Supplies. John A. Gould.
May 20.
Housing Conditions in the Northern Mining Districts.

Public Health, London.

XXIX. May.

- A Discussion on Maternity and Child Welfare. H. Renney.
Tuberculosis and Cotton Operatives—Some Problems. A. M. Hewat.
Cerebro-Spinal Fever: An Analysis of the St. Pancreas Cases in the Epidemic of 1915. T. S. Higgins.
On the Application of Vaccines to the Treatment of Diphtheria. J. P. Johnson.
Discussion on Measles Regulations.

FRANCE.

Paris Medical.

VI. March 25.

- Diagnosis and Prognosis of Paratyphoid Infection. L. Rinibaud.
Necessity for Special Services for Digestive, Infectious and Respiratory Affections. G. Rosenthal.

April 8.

- The Mirror as Aid in Obtaining Sputum for Examination. G. Rosenthal.

April 15.

- Piping Drinking Water in the Trenches. Lemoine and Duplessis.
Rat-Bite Fever. J. Fievez.

April 22.

- Malaria in Flanders. F. Rathery and R. Michel.

Bulletin de l'Académie de Médecine, Paris.

LXXV. March 28.

- The Birth-Rate in France and Its Colonies. A. Pinard.
Venereal Diseases During the War at Military Hospitals in Paris. Gaucher.
Dispensary Treatment of Syphilis. Jeanselme and Hudelo.
April 4.
Prophylaxis of Scarlet Fever by Milne's Method. Lemoine and Devin.
Amebic Dysentery in France. Orticoni and Ameuille.

April 18.

Appeal for Suppression of Garbage Picking Inside City Limits. Wurtz.
 The Prevalence of Syphilis not Recognized before the War. L. Landouzy.
 Rational Treatment of Syphilis under Guidance of Wassermann Test. E. Jeanselme.

GERMANY.**Berliner Kleinische Wochenschrift.***LIII. April 27.*

Prophylaxis of Tetanus. Kümmell.

Deutsche medizinische Wochenschrift, Berlin.*XLII. April 13.*

Parasite Found in the Louse as Possible Typhus Germ. W. Stenfell.
 Diagnosis and Epidemiology of Dysentery. F. Schütz.
 Tuberculin Does not Mobilize the Tubercle Bacilli. Möllers and Oehler.
 Improved Counting Chamber. E. Liebreich.

Monatschrift für Kinderheilkunde, Berlin.*XIII. No. 9.*

The Schick Test for Immunity to Diphtheria. Vessau and Schwenke.

No. 11.

Epidemiologic Study of Measles. H. Wagner.

Münchener medizinische Wochenschrift, Munich.*LXIII. March 28.*

Local Treatment of External Tuberculosis. A Strauss.
 Amyloid Degeneration Seems to be Work of Bacillus of Friedländer Group. A. Frank.
 Yeast as Food. H. Wintz.
 Official Directions for Prophylaxis of Tuberculosis. M. Henkel.

April 18.

Streptococcus plus Diphtheria Bacillus Meningitis. F. Reiche.
 Official Prophylaxis of Typhoid Fever. M. Henkel.
 Bile Agar for Cultivation of Typhoid Bacilli. L. Löhrner.

BOOKS RECEIVED.

Tobacco Habit Easily Conquered. By Max MacLevy. Albro Society, Inc., New York City. 1916. Pp. 154. Price, \$1.25, net.

Second Pan American Scientific Congress, Final Act. Prepared by James Brown Scott, LL. D. 1916. Government Printing Office, Washington, D. C.

The Mortality of Cancer throughout the World. By Frederick L. Hoffman, LL. D. The Prudential Press, Newark, N. J. 1916. Pp. 800. Charts and tables.

Transactions of the Sixth Annual Meeting of the American Association for Study and Prevention of Infant Mortality. Executive Secretary,

Miss Gertrude Knipp, 1211 Cathedral Street, Baltimore, Md. 1916. Pp. 467.

Campaign for Clean Milk. A Series of Articles That Have Appeared in the *Observer*. Published by the Saint Catherine Press, London, for the National Clean Milk Society, Inc. 1916. Pp. 51. Price, one shilling, net.

Coal-Mine Fatalities in the United States, 1870-1914. Compiled by Albert H. Fay. Bulletin 115, Department of the Interior, Bureau of Mines. 1916.

Summary of the Report on Condition of Woman and Child Wage-Earners in the United States. Bulletin 175. Department of Labor, Bureau of Labor Statistics. 1916.

AMERICAN
PUBLIC HEALTH
ASSOCIATION

REVISED
List of Members

JUNE FIRST
1916

This list includes all those who have maintained their membership to June 1, 1916. Section affiliations are indicated as far as the Secretary has been able to ascertain them. Kindly notify the Secretary of all errors or omissions.

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June 1, 1916.

*Indicates members of Laboratory Section.

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‡ Indicates Sanitary Engineering Section.

§ Indicates members of Vital Statistics Section.

|| Indicates members of Sociological Section.

** Indicates members of Industrial Hygiene Section.

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ABERTHAY, WM. GREEN, M. D.	Woodland, Miss.	1914
ADAMS, GEORGE E.	676 Jefferson St., Milwaukee, Wis.	1914
ADAMS, F., M. D.	497 Brunswick Ave., Toronto, Ont.	1915
ADAMS, GEORGE O.	Experiment Station, Lawrence, Mass.	1914
ADAMS, SAMUEL HOPKINS	Ensenore, N. Y.	1915
AGRAMONTE, ARISTIDES, M. D.	K St., 146-148 Vedado, Havana, Cuba	1915
*†ALBERT, HENRY, M. D.	221 South Lucas St., Iowa City, Iowa	1907
*ALDEN, A. M.	Santa Tomas Hospital, Ancon, C. Z.	1913
ALEXANDER, MORRIS J., SR., M. D.	Tunica, Miss.	1916
†ALLEN, A. F.	Asst. Health Officer, Tuscaloosa, Ala.	1913
†ALLEN, KENNETH	Municipal Bldg., New York City	1915
||ALLEN, L. C., M. D.	Hoschton, Ga.	1914
ALMY, FREDERICK	181 Franklin St., Buffalo, N. Y.	1915
*ALSBERG, CARL L.	Bureau of Chemistry, Washington, D. C.	1913
†ALVORD, JOHN W.	127 Hartford Bldg., Chicago, Ill.	1899
AMER. TEL. & TEL. CO.	15 Dey St., New York City	1915
AMERMAN, MISS BESSIE ELY	265 Henry St., New York City	1916
*AMOS, HAROLD L.	Rockefeller Institute, New York City	1911
*†AMYOT, JOHN A., M. D.	4 Laburmen Ave., Toronto, Ont.	1900
ANDERSON, JOHN B., M. D.	Health Officer, Spokane, Wash.	1912
*ANDERSON, JOHN F., M. D.	Care E. R. Squibb & Sons, New Brunswick, N. J.	1903
*ANDREWS, C. J., M. D.	511 Taylor Bldg., Norfolk, Va.	1912
**ANDREWS, JOHN B.	131 East 23d St., New York City	1913
APP, JOHN C.	1008 Quarrier St., Charleston, W. Va.	1916
ARCHIBALD, ROBERT A., M. D.	1724 Webster St., Oakland, Cal.	1910
ARKIN, AARON	519 Front St., Morgantown, W. Va.	1914
ARMAGNAC, ARTHUR S.	1123 Broadway, New York City	1915
ARMENT, SAMUEL B., M. D.	25 West 5th St., Bloomsburg, Pa.	1901
*†ARMS, B. L., M.D., Bacteriological Laboratory, State Board of Health, Montgomery, Ala.		1906
§||ARMSTRONG, D. B., M. D.	39 Pearl St., Stapleton, N. Y.	1913

ARNOLD, FRANK	408 House Bldg., Pittsburgh, Pa.	1913
†ASCANIO, RAMON, M. D.	San Jose Delas Lajas, Havana, Cuba	1911
*†||ASHFORD, BAILEY K. (Maj.), M. D.	San Juan, P. R.	1912
ASHLEY, BURTON J.	11112 South Hoyne Ave., Chicago, Ill.	1915
ATWELL, FLOYD J., M. D.	48 Chestnut St., Cooperstown, N. Y.	1915
ATWOOD, FRANK GARWOOD	158 Whalley Ave., New Haven, Conn.	1914
AYER, IRA, M. D.	Bangkok, Siam	1915
AYRES, J. M.	City Health Officer, Bennington, Vt.	1914
*AYRES, S. HENRY	Dairy Division, U. S. Dept. Agriculture, Washington, D. C.	1912
†BACHARACH, E. W.	429-31 Rialto Bldg., Kansas City, Mo.	1914
BACHMANN, FRANK	102 Civil Engineering Bldg., Berkeley, Cal.	1915
BACHMEYER, A. C., M. D.	Cincinnati General Hospital, Cincinnati, Ohio	1916
*BAILEY, EDGAR H. S., M. D.	1101 Ohio St., Lawrence, Kan.	1910
BAILEY, WILLIAM J.	802 Twiggs St., Tampa, Fla.	1915
BAILEY, WM. S.	110 East 4th St., Jamestown, N. Y.	1915
BAKEMAN, G. W.	1022 Chestnut St., Newton Upper Falls, Mass.	1914
††BAKER, CLARENCE M.	189 Kent St., Albany, N. Y.	1914
BAKER, JOHN	539 Main St., Stamford, Conn.	1915
††||BAKER, M. N.	53 Oakwood Ave., Upper Montclair, N. J.	1912
BAKER, S. JOSEPHINE, M. D.	139 Centre St., New York City	1915
*BALCH, ALFRED W., M. D.	416 Huntington Ave., Boston, Mass.	1914
*†BALDWIN, F. O.	706 Chamberlayne Ave., Richmond, Va.	1912
*BALDWIN, FREDERICK A.	Metropolitan Bldg., St. Louis, Mo.	1914
*BALDWIN, HERBERT B.	927 Broad St., Newark, N. J.	1905
||§BALDWIN, W. H.	1415 Twenty-first St., Washington, D. C.	1914
†BALL, C. B.	4227 North Ashland Ave., Chicago, Ill.	1910
BALL, H. J., M. D.	Cortland, N. Y.	1915
BALLINGER, T. DUDLEY	294 Park Ave., Orange, N. J.	1913
BANTRELL, M. A., C. E.	206 Meigs St., Rochester, N. Y.	1916
BARBER, PROF. MARSHALL A.	Univ. of Kansas, Rosedale, Kan.	1906
†BARBOUR, F. A., C. E.	1121 Tremont Bldg., Boston, Mass.	1900
BARBOUR, MRS. NORAH JOHNSON	37 Batterymarch St., Boston, Mass.	1915
BARNES, A. S., JR., M. D.	210 Cent. Nat. Bldg., St. Louis, Mo.	1915
BARNES, H. J., M. D.	429 Beacon St., Boston, Mass.	1896
BARNES, T. H.	1646 Whitehall Bldg., New York City	1910
BARNEY, S. E.	346 Whitney Ave., New Haven, Conn.	1914
BARRICK, CALVIN W., M. D.	Birdsall, N. Y.	1915
BARRY, MISS ANNA L., R. N.	State Health Dept., Albany, N. Y.	1915
BARTHOLOMEW, H. S., M. D.	103 Main St., West, Lansing, Mich.	1916
BARTLETT, C. W.	508 Oak Ave., Tampa, Fla.	1914
BARTLETT, MURRAY, M. D.	357 Gral Luna, Manila, P. I.	1915
*†BARTOW, EDWARD	Univ. of Illinois, Urbana, Ill.	1905
BASHORE, HARVEY B., M. D.	West Fairview, Pa.	1897
BASS, F. H.	429 Union St., South East, Minneapolis, Minn.	1907
*BASSETT, VICTOR H., M. D.	Savannah, Ga.	1912
BATEMAN, PROF. ARTHUR	10-12 West Ontario St., Chicago, Ill.	1915
*BATES, CARLETON	United States Glue Co., Milwaukee, Wis.	1914
*BATON, W. U. C.	528 South Lang Ave., Pittsburg, Pa.	1908
§BATT, WILMER R., M. D.	2138 North 2d St., Harrisburg, Pa.	1907
BATZELL, PAUL E.	181 Franklin St., Buffalo, N. Y.	1915
BAZZONI, PROF. C. B.	Care American Express Co., 6 Haymarket St., London, England	1914

BEACH, DE MOTT C.	175 Jay St., Albany, N. Y.	1914
BEAGLE, FENIMORE D.	State Health Dept., Albany, N. Y.	1915
BEARD, J. HOWARD, M. D.	503 South Race St., Urbana, Ill.	1914
BEARD, PROF. R. O.	Univ. of Minnesota, Minneapolis, Minn.	1914
*BECKWITH, T. D.	Agricultural College, Corvallis, Ore.	1911
BEEBE, HENRY E., M. D.	Sidney, Ohio	1882
*BEEBE, W. L., M. D.	Lowry Annex, St. Paul, Minn.	1907
BEER, JAMES A., M. D.	55 East State St., Columbus, Ohio	1915
†BEGG, PROF. R. B. H.	Virginia Polytechnic Institute, Blacksburg, Va.	1912
*§BEITLER, F. V., M. D.	Ridge Ave., Hallthorp, Md.	1911
BELAN, MISS LAETITIA LOUISA	666 Diversey Bldg., Chicago, Ill.	1914
†BELL, F. D.	39 West 38th St., New York City	1907
*BELL, GORDON, M. D.	Winnipeg, Man.	1899
*†BELL, R. W.	350 Davenport Rd., Toronto, Ont.	1908
BELL, W. G.	609 West Main St., Gainesville, Fla.	1914
BENEDICT, CHARLES C., M. D.	Anchorage, Alaska	1916
BENNETT, A. G., M. D.	Connecticut Ave., Greenwich, Conn.	1914
†BENSEL, W., M. D.	105 West 74th St., New York City	1913
BENTLEY, D. B., M. D.	Sarnia, Ont.	1915
BENTZ, CHARLES A., M. D.	84 Orange St., Buffalo, N. Y.	1916
BERGER, FREDERICK W.	2200 Essex St., Baltimore, Md.	1916
BERGEY, DAVID H.	206 South 53d St., Philadelphia, Pa.	1915
BERNHAGEN, LEWIS OTTO	1502 Second Ave., South, Minneapolis, Minn.	1914
BERNIER, ARTHUR, M. D.	Laval University, St. Denis St., Montreal, Que.	1914
BERRY, CHARLES WHITE, M. D.	572 Forty-seventh St., Brooklyn, N. Y.	1914
BESEMER, A. M., B. S.	324 College Ave., Ithaca, N. Y.	1915
*BEYER, H. G., M. D.	The Marlborough, Washington, D. C.	1910
†BIERRING, WALTER L., M. D.	Equitable Bldg., Des Moines, Iowa	1913
BIGELOW, W. D.	1739 H St., North West, Washington, D. C.	1914
†BIGGS, HERMANN M., M. D.	113 West 57th St., New York City	1913
*BILLINGS, F. H.	Univ. of Kansas, Lawrence, Kan.	1912
*BILLINGS, J. S., M. D.	149 Center St., New York City	1905
†BINGHAM, DON W.	621 Oakland Bldg., Lansing, Mich.	1914
BIRD, U. S., M. D.	P. O. Box 792, Tampa, Fla.	1914
*†BIRDSALL, LEWIS I.	Supt. Filtrations, St. Anthony Falls Sta., Minneapolis, Minn.	1912
*BURGE, E. G.	State Health Board, Tampa, Fla.	1907
BISHOP, ROBT. H., JR., M. D.	501 St. Clair Ave., Cleveland, Ohio	1912
BISSELL, WILLIAM G., M. D.	1467 Amherst St., Buffalo, N. Y.	1914
BIZE, L. A., M. D.	Citizens Bank Bldg., Tampa, Fla.	1914
†BLACK, J. T., M. D.	285 Montauk Ave., New London, Conn.	1914
*BLANCK, F. C.	Bureau of Chemistry, Washington, D. C.	1911
BLISS, CHAS. L.	Board of Health, Detroit, Mich.	1915
†BLUE, RUPERT, M. D.	3 B St., Washington, D. C.	1912
BOARDMAN, W. H.	426 Walnut St., Philadelphia, Pa.	1914
*†BOLDUAN, C. F., M. D.	139 Center St., New York City	1912
*†BOLLING, GEORGE E.	City Hall, Brockton, Mass.	1900
BOLLING, R. C.	Dublin Rd., Greenwich, Conn.	1915
*BONNET, FREDERIC, JR.	22 Dayton St., Worcester, Mass.	1913
BOOKER, WARREN H.	State Health Board, Raleigh, N. C.	1912
BOOTH, JOHN T., M. D.	1110 Capitol St., Richmond, Va.	1915
BOSWELL, HENRY, M. D.	Booneville, Miss.	1916
BOSWORTH, ROBINSON, M. D.	824 Lowry Bldg., St. Paul, Minn.	1914

BOTELER, GEORGE McCARY	825½ Frederick Ave., St. Joseph, Mo.	1914
BOTSFORD, C. P., M. D.	219 Collins St., Hartford, Conn.	1911
†BOUCHER, S., M. D.	412 Rue St. Denis, Montreal, Que.	1914
BOUDREAU, FRANK G., M. D.	305 Seventeenth Ave., Columbus, Ohio	1916
BOUTON, OTIS Z., M. D.	Main St., Fultonville, N. Y.	1915
BOW, MALCOLM R., M. D.	Regina, Sask.	1915
BOWEN, D. C.	707 Fourth Ave., Asbury Park, N. J.	1915
*BOWLES, J. T. B.	39 West 38th St., New York City	1907
BOWMAN, WALDO M.	319 Superior St., Toledo, Ohio	1915
BOWMAN, WM. F.	East Orange, N. J.	1915
BOYCHEFF, G. T., M. D.	1107 Milton Ave., Solvay, N. Y.	1915
*BOYD, MARK F., M. D.	Univ. of Iowa, Iowa City, Iowa	1913
BOYNTON, CLARENCE N., M. A.	311-316 Goodrich Bldg., Phoenix, Ariz.	1916
BRADFORD, G. D., M. D.	Cayuga St., Homer, N. Y.	1915
BRADLEY, D. M., M. D.	Way Cross, Ga.	1914
BRAMLEY, HARRY E.	39-41 West 38th St., New York City	1912
BRANSFIELD, P. E.	18 Marlborough St., Portland, Conn.	1914
BRASWELL, JAMES C., JR.	Nashville, N. C.	1915
BRAUNNAGEL, JULIUS, M. D.	Box 925, San Antonio, Tex.	1890
BRAY, PROF. W. J.	1303 East Scott St., Kirksville, Mo.	1915
*BREED, ROBT. S.	N. Y. Experiment Station, Geneva, N. Y.	1909
BREM, WALTER V.	932 Maltman Ave., Los Angeles, Cal.	1915
*BREWER, ISAAC W., M. D.	Geneva, N. Y.	1915
BRIDGE, NORMAN, A. M., M. D.	10 Chester Pl., Los Angeles, Cal.	1915
BRIGGS, A. B., M. D.	Ashaway, R. I.	1915
BRIGGS, EDWARD F., M. D.	Bedford Hills, N. Y.	1915
BRINK, F. A., M. D.	1212 East Lee St., Pensacola, Fla.	1914
*BRISTOL, L. D., M. D.	Univ. of North Dakota, University, N. D.	1914
BROOKS, JAMES E.	6 Wildwood Ter., Glen Ridge, N. J.	1912
BROOKS, P. B.	32 East Main St., Norwich, N. Y.	1915
*BROWN, CLAUDE P., M. D.	38 East Logan Ave., Glenolden, Pa.	1912
BROWN, E. W., M. D.	U. S. S. "Bushnell," care The Postmaster, New York City	1914
BROWN, H. A., M. D.	306 Fourth St., South East, Washington, D. C.	1913
*BROWN, HERBERT R.	47 Hamstead Rd., Forest Hills, Boston, Mass.	1910
BROWN, JAMES R.	47 West 42d St., New York City	1915
BROWN, JOSEPH R., M. D.	Seward, N. Y.	1915
BROWN, LAWRASON, M. D.	104 Main St., Saranac Lake, N. Y.	1915
BROWN, LUCIUS P., M. D.	Centre and Walker Sts., New York City	1915
*BROWN, R. H.	Engineering Bldg., Columbia University, New York City	1907
BROWN, W. E.	53 Oxford St., Cambridge, Mass.	1915
BROWN, WALTER E.	Box 96, Noblesville, Ind.	1915
BROWN, WALTER H., M. D.	10 Remington St., Cambridge, Mass.	1915
BROWNE, JAMES ALEXANDER, M. D.	364 Van Houten St., Paterson, N. J.	1914
*BROWNE, W. W.	Coll. of the City of N. Y., 139th St., New York City	1911
BRUMFIELD, W. A., M. D.	1112 Wise St., Lynchburg, Va.	1915
BRUNDAGE, N. E., M. D.	Delphos, Ohio	1916
†BRUNNER, WM. F., M. D.	City Hall, Savannah, Ga.	1914
†BRYCE, PETER H., M. D.	Dept. of Interior, Ottawa, Ont.	1883
†BUCK, A. W.	1 Beacon St., Boston, Mass.	1914
*BUCKLAND, THOMAS A.	9 Municipal Court Bldg., St. Louis, Mo.	1910
*BULL, IRVING C.	100 Maiden Lane, New York City	1912
*BULLARD, THOMAS E., M. D.	100 Church St., Schuylerville, N. Y.	1914

*†BUNKER, JOHN W. M., M. D.	Care Digestive Ferments Co., 20 Locust St., Detroit, Mich.	1911
BURKART, JOHN L., M. D.	<i>See Michigan State Health Board</i>	
*BURNETT, CLOUGH T., M. D.	302 Mercantile Bank Bldg., Boulder, Colo.	1913
BURNS, HARRY B., M. D.	Fulton Bldg., Pittsburgh, Pa.	1915
BURNS, RICHARD G., M. D.	8 Dunlap Ave., Pittsburgh, Pa.	1915
BURR, DANIEL S.	143 Court St., Binghamton, N. Y.	1915
*§BURRAGE, PROF. SEVERANCE	Care Ely Lilly & Co., Indianapolis, Ind.	1909
*BURTON, LAWRENCE V.	434 Temple St., New Haven, Conn.	1914
*†BUSWELL, A. M.	Columbia University, New York City	1914
*BUTTLES, E. H., M. D.	Burlington, Vt.	1912
BUZZELL, R. S.	80 East 5th St., Flint, Mich.	1914
*†CAIRD, JAS. M.	271 River St., Troy, N. Y.	1900
CAIRNS, A. A., M. D.	S. E. Cor. 7th and Medary Aves., Philadelphia, Pa.	1914
CAL. STATE BOARD OF HEALTH	Box 587, Sacramento, Cal.	1916
CAMERON, R. L., M. D.	2109 Elm St., Youngstown, Ohio	1915
†CAMPBELL, ALBERT E., M. D.	Railroad Health Officer, Illinois Central R. R. Co., Chicago, Ill.	1913
CAMPBELL, H. M.	3d and Kilgour Sts., Cincinnati, Ohio	1914
†CANNON, W. F.	1914 Pennsylvania Ave., Denver, Colo.	1913
CAPRON, V. J., M. D.	930 Henry Bldg., Seattle, Wash.	1916
CARLSON, ARTHUR J., M. D.	1003 Detta Ave., Escanaba, Mich.	1915
CARNEY, ANDREW, JR.	121 Prospect St., Westfield, N. J.	1915
CARPENTER, WILLIAM F.	1316 Delamere Pl., Brooklyn, N. Y.	1915
CARPENTER, W. J., M. D.	Katanah, N. Y.	1914
†§||CARR, E. ARTHUR, M. D.	516 Bankers Life Bldg., Lincoln, Neb.	1910
CARROLL, THOMAS B., D. V. S.	106 North 2d St., Wilmington, N. C.	1915
†CARSON, HARRY Y.	90 West St., New York City	1914
*CARTAYA, JOSÉ, M. D.	Hospital Las Animas, Havana, Cuba	1911
*CARTER, PROF. CHARLES	Parsons College, Fairfield, Iowa	1916
CARTER, E. B.	810 East 25th St., Indianapolis, Ind.	1916
CARY, R. J., B. S., M. D.	Mountain View Sanatorium, Lake View, Wash.	1916
†CASE, GEORGE W.	3142 Avalon St., Pittsburgh, Pa.	1915
CASWELL, HARLAN O.	81 North Main St., Ft. Atkinson, Wis.	1916
*†CATLETT, G. F.	Director of Laboratory, County Board of Health, Wilmington, N. C.	1914
†CAVERLEY, CHAS. S., M. D.	Rutland, Vt.	1894
††CAUCHON, N.	Canada Life Bldg., Ottawa, Ont.	1912
CHADDOCK, PROF. ROBT. E.	403 West 115th St., New York City	1915
§CHALMERS, HENRY	State Health Dept., Albany, N. Y.	1914
CHAMOT, E. M.	Cornell University, Ithaca, N. Y.	1905
CHAMPION, MERRILL E., M. D.	50 Phillips St., Wollaston, Mass.	1915
CHANDLER, PROF. C. F.	Columbia University, New York City	1872
†CHANDLER, DAVID D.	376 Roseville Ave., Newark, N. J.	1896
†CHANDLER, N. J. R.	104 East Front St., Plainfield, N. J.	1914
†CHAPMAN, F. T.	104 West 42d St., New York City	1912
†§CHAPIN, C. V., M. D.	Providence, R. I.	1886
CHAPMAN, G. A., M. D.	23 Elm St., Glen Falls, N. Y.	1915
*†CHASE, E. S.	State Health Dept., Albany, N. Y.	1909
†CHASE, JOHN C.	Derry Village, N. H.	1890
CHASE, J. FRANK	200 Equitable Bldg., Boston, Mass.	1915
CHEATHAM, ARCH M., M. D.	705 Cleveland St., Durham, N. C.	1914
*†CHESLEY, A. J., M. D.	State Health Board, Minneapolis, Minn.	1909

†CHESTER, JOHN N.	Union Bank Bldg., Pittsburgh, Pa.	1911
CHICHESTER, C. E. L.	936 Madison Ave., Albany, N. Y.	1915
CHIDESTER, W. S.	Punta Gorda, Fla.	1913
CHILSON, HENRY L., M. D.	408 Main St., Bradentown, Fla.	1914
CHRISTIAN, MRS. LEONORA H.	404 South 8th St., Minneapolis, Minn.	1915
CITY BOARD OF HEALTH	City Hall, Indianapolis, Ind.	1915
†CITY WATER BOARD	7 Exchange St., Auburn, N. Y.	1915
CIVIC LEAGUE, COLORADO SPRINGS	Care Mrs. C. J. Wright, 1719 North Nevada Ave., Colorado Springs, Colo.	1915
CLAFFY, THOMAS H.	10057 Longwood Dr., Chicago, Ill.	1914
CLAPP, SIDNEY K.	Ashokan, N. Y.	1914
CLARK, EDWARD, M. D.	573 Elliott Sq., Buffalo, N. Y.	1914
*†CLARK, H. W.	502 State House, Boston, Mass.	1896
*CLARK, P. F.	Univ. of Wisconsin, Madison, Wis.	1906
*†CLAXTON, WILLIAM A., M. D.	Canadian Medical Service, Cairo, Egypt	1914
CLEGHORN, GUY F.	Mineola, N. Y.	1915
†CLEVELAND, H. BURDETT	287 Western Ave., Albany, N. Y.	1914
CLINTON, GEORGE	126 East Bridge St., Belleville, Ont.	1912
*CLORE, LEX B.	Address unknown	1913
*CLOSSON, OLIVER E.	336 Hurburt St., Detroit, Mich.	1908
*COBB, CHAS. N., SUPT.	Water Works, Kankakee, Ill.	1908
*COBLEIGH, WILLIAM M., M. D.	909 South 3d Ave., Bozeman, Mont.	1914
†COBURN, WILLIAM HASKINS	Care Engineering Dept., Amer. Woolen Co., Wash. Co., Wash. Lawrence, Mass.	1914
COCHRAN, WILLIAM F.	Woodbrook, Md.	1915
CODDING, EDWIN H.	New Rochelle, N. Y.	1913
COGSWELL, WILLIAM F., M. D.	Helena, Mont.	1913
§COHEN, J. X.	104 City Hall, Syracuse, N. Y.	1915
§||COHEN, MORRIS	68 East 118th St., New York City	1914
COLBY, BERN D., M. D.	Sudbury, Vt.	1916
†§COLE, HILLS, M. D.	1748 Broadway, New York City	1907
COLE, R. W. E., M. D.	York Village, Me.	1914
COLLINS, HERBERT O.	City Hospital, Minneapolis, Minn.	1914
*COLLINS, KATHERINE R., M. D.	State Health Board, Atlanta, Ga.	1910
COLLINS, WILLIAM BELL, M. D.	State Health Dept., Austin, Tex.	1915
COLSON, HENRY C., JR.	Abington, Mass.	1914
†COLTON, MAX J., M. D.	Cumberland, Md.	1913
*†§COMMISSION OF CONSERVATION, CHARLES A. HODGETTS, M. D.	Ottawa, Canada	1905
COMMITTEE OF FOURTEEN	27 East 22d St., New York City	1915
†CONANT, ELBRIDGE R.	209 West 34th St., Savannah, Ga.	1914
CONGDON, CHARLES F., M. D.	29 Willow St., Mystic, Conn.	1916
*CONN, PROF. H. W.	Middletown, Conn.	1907
*CONNELL, W. T., M. D.	11 Arch St., Kingston, Ont.	1908
*†CONNOLLY, R. N., M. D.	City Hospital, Newark, N. J.	1898
CONSUMERS' LEAGUE OF MASSACHUSETTS, INC.	4 Joy St., Boston, Mass.	1915
CONWAY, JOHN A., M. D.	32 Broad St., Hornell, N. Y.	1914
**COOKE, DWIGHT I.	111 South Jefferson St., Chicago, Ill.	1915
COOKE, LANE B., M. D.	Care American Consul, Vera Cruz, Mex.	1915
COOK, DEWITT, JR.	70 Hawthorne Ave., East Orange, N. J.	1914
COOLIDGE, MISS ELLEN W.	81 Marlboro St., Boston, Mass.	1915
COOTE, H. L. B., M. D.	312 East Michigan St., Michigan, Ind.	1915
CORNELL, WALTER S., M. D.	729 City Hall, Philadelphia, Pa.	1915

CORWIN, R. W., M. D.	Minniqua Hospital, Pueblo, Colo.	1913
COUSINEAU, AIMÉ	Health Dept., City Hall, Montreal, Que.	1915
*COWARD, F. A., M. D.	1410 Senate St., Columbia, S. C.	1912
**COX, ERNEST H., M. D.	2047 East 9th St., Cleveland, Ohio	1915
COX, GROVER S., M. D.	Box 61, Tabor, N. C.	1914
COX, J. F.	P. O. Box 307, Winnipeg, Man.	1908
COX, JOHN W., M. D.	414 University Ave., Grand Forks, N. D.	1914
§COX, ROBERT LYNN	165 Broadway, New York City	1913
CRAFT, CLARENCE C., M. D.	Postou, S. C.	1914
||CRAMPTON, C. WARD, M. D.	431 Riverside Dr., New York City	1914
CRANE COMPANY, THE	836 Michigan Blvd., Chicago, Ill.	1915
**†CRANKSHAW, CHARLES W., M. D.	Prudential Insurance Co., Newark, N. J.	1913
CRAWFORD, B. E., M. D.	2215 Montrose Ave., Chicago, Ill.	1914
CREEL, RICHARD H., M. D.	163 Dryades St., New Orleans, La.	1915
CRESSMAN, RALPH G., M. D.	Oglesby, Ill.	1914
†§CRIGLER, WALLACE P.	Ocala, Fla.	1914
*CROCKER, FRED L.	Tenn. Coal Iron & R. R. Co., Birmingham, Ala.	1912
CROCKETT, ROBERT L., M. D.	131 Main St., Oneida, N. Y.	1915
CROCKETT, SIDNEY S.	Vanderbilt Campus, Nashville, Tenn.	1915
CROSTON, JOHN F., M. D.	83 Emerson St., Haverhill, Mass.	1911
**†CROWDER, T. R., M. D.	Pullman Bldg., Chicago, Ill.	1905
CROWELL, MISS ELIZABETH F.	105 East 22d St., New York City	1915
§CRUM, FREDERICK S.	751 Clifton Ave., Newark, N. J.	1907
†CRUM, H. H., M. D.	City Hall Annex, Ithaca, N. Y.	1909
†CRUMBINE, S. J., M. D.	State House, Topeka, Kan.	1912
CUDDEBACK, EDGAR G., M. D.	Port Jervis, N. Y.	1915
CULBERTSON, R. B., M. D.	Dauphin, Man.	1913
CUMING, H. T., M. D.	Gloster, Miss.	1916
CUMMINS, EARL H.	45 Westland Ave., Boston, Mass.	1916
CUMMINS, HERSCHEL B.	Seward, Neb.	1910
CURRY, GROVE P. M., M. D.	Mt. Kisco, N. Y.	1906
*CURTIS, FRANCIS GEO., M. D.	City Hall, West Newton, Mass.	1897
*DALTON, CHARLES F., M. D.	52 North Winooski Ave., Burlington, Vt.	1912
*†DANIELS, F. E.	1409 North Front St., Harrisburg, Pa.	1909
DARLING, PROF. CHESTER A.	Allegheny College, Meadville, Pa.	1915
DAVIDSON, ALVIN	366 Van Houten St., Passaic, N. J.	1910
†DAVIS, CHARLES O.	422 Fourth Ave., Milwaukee, Wis.	1914
DAVIS, JOE DYER, M. D.	State Health Dept., Austin, Tex.	1914
DAVIS, MICHAEL M., JR.	25 Bennett St., Boston, Mass.	1915
*DAVIS, LEWIS	201 Hancock Ave., East, Detroit, Mich.	1913
DAVIS, NELSON C., M. D.	494 Rutherford Ave., Boston, Mass.	1914
DAVIS, WILLIAM A., M. D.	Capitol Station, Austin, Tex.	1915
DAVIS, WILLIAM H., M. D.	23 Beaumont St., Dorchester, Mass.	1911
DAWSON, CHARLES F.	Jacksonville, Fla.	1914
DEACON, W. J. V.	1254 Polk St., Topeka, Kan.	1912
DEAN, J. ATLEE	5420 Baltimore Ave., Philadelphia, Pa.	1915
†DEARHOLT, HOYT E., M. D.	471 Van Buren St., Milwaukee, Wis.	1910
*†DECKER, A. CLINTON	Box 790, Birmingham, Ala.	1911
||DE FORREST, ROBERT W.	30 Broad St., New York City	1912
DE GREY, FRANK, M. D.	Prov. Health Board, Victoria, B. C.	1914
DE KLEINE, WILLIAM, M. D.	1007 East Michigan Ave., Lansing, Mich.	1915

†DE LANO, WILLIAM, M. D.	510 South Union St., Grand Rapids, Mich.	1907
DENNIS, S. C.	College Park, Md.	1915
†DENNO, WILLARD J., M. D.	16 Central Park, West, New York City	1914
*†DENNY, FRANCIS P., M. D.	111 High St., Brookline, Mass.	1901
DE PREE, CON.	Holland, Mich.	1912
DE PREE, JAMES.	902 Chamber Commerce Bldg., Chicago, Ill.	1915
DERIVAUX, ROBT. C., M. D.	25th and E Sts., Washington, D. C.	1915
DICKINSON, G. K., M. D.	278 Montgomery St., Jersey City, N. J.	1905
DICKINSON, MISS MAY B.	Trinity Ct., Dartmouth St., Boston, Mass.	1915
DICKSON, HUGH F.	26 Washington Ave., Covington, Tenn.	1914
†DIGGETT, E. W.	Tallahassee, Fla.	1911
DIKE, I. A. M., M. D.	York, N. Y.	1915
*DINGLE, J. H.	City Hall, Charleston, S. C.	1910
*†DITTOE, WILLIAM H.	Ohio State Board of Health, Columbus, Ohio	1913
§DIXON, SAMUEL G., M. D.	1900 Race St., Philadelphia, Pa.	1905
DOBBS, CLARENCE H., M. D.	Asst. to State Health Officer, Jacksonville, Fla.	1914
DODD, JOHN M., M. D.	610 Ellis Ave., Ashland, Wis.	1913
*DODD, W. L.	373 Garland Ave., Detroit, Mich.	1912
*DOLE, RICHARD B.	U. S. Geological Survey, Washington, D. C.	1905
D'OLIER, WILLIAM L.	702 Morris Bldg., Philadelphia, Pa.	1915
†DOMINGUES, A. G., M. D.	Box 1131, Havana, Cuba	1911
DONALDSON, WELLINGTON.	Birmingham Water Works, Birmingham, Ala.	1915
DONOHUE, GEORGE.	Cherokee State Hospital, Cherokee, Iowa	1915
*†DOOLITTLE, ROSCOE E.	109 Hillside Ave., Glen Ridge, N. J.	1912
DOSSIN, ALBERT P.	37 North 4th St., Meriden, Conn.	1914
DOTY, ALVAH H., M. D.	205 West 57th St., New York City	1896
†§DOUGLAS, A. J., M. D.	City Health Dept., Winnipeg, Man.	1903
*DOUPE, G. LONSDALE.	Care C. P. R. R., Winnipeg, Man.	1906
†DOWD, WYLLYS E., JR.	111 Broadway, New York City	1912
†DOWLING, OSCAR W., M. D.	New Orleans, La.	1911
DOWNES, JOHN R.	48 Rock Ave., Plainfield, N. J.	1915
†§DOWNS, A. SHERMAN, M. D.	139 Circular St., Saratoga, N. Y.	1914
§DRAKE, CHESTER F.	Filtration Works, Aspinwall, Pa.	1914
†§DRAKE, C. ST. CLAIR, M. D.	Springfield, Ill.	1914
DRESSER, RICHARD.	54 College St., Providence, R. I.	1915
||DRESSLAR, FLETCHER B., M. D.	Peabody College, Nashville, Tenn.	1911
*DREYFUS, WILLIAM.	57 East 96th St., New York City	1905
DRINKWATER, ERNEST, C. E.	588 Bird St., St. Lambert, Que.	1914
§DUBLIN, LOUIS L.	1 Madison Ave., New York City	1912
DUFFIELD, THOMAS J.	P. O. Box 272, Summit, N. J.	1915
*†DUNCAN, ELLIS M., M. D.	City Hall, Birmingham, Ala.	1909
DUNGAN, SAMUEL O.	1100 East 15th St., Indianapolis, Ind.	1913
*DUNHAM, EDWARD K., M. D.	35 East 68th St., New York City	1905
†§DURGIN, SAMUEL H., M. D.	Millbrook, Mass.	1875
DURKEE, MISS C. JOSEPHINE.	186 State St., Albany, N. Y.	1915
†||DURYEE, CHARLES CHAUNCEY, M. D.	1352 Union St., Schenectady, N. Y.	1914
†DUTTON, C. E., M. D.	602 Cicoller Ave., Minneapolis, Minn.	1913
†‡DYER, ELBRIDGE G.	1905 East 73d St., Cleveland, Ohio	1911
†EAKINS, WALLACE T.	101 Hamilton St., New Brunswick, N. J.	1914
EASON, SAM. E., M. D.	New Albany, Miss.	1914
EICHEL, OTTO R., M. D.	28 Chestnut St., Albany, N. Y.	1915

†	EARL, GEORGE G.	502 City Hall Annex, New Orleans, La.	1902
**	EASTON, ERNEST D.	45 Clinton St., Newark, N. J.	1915
*	EATON, CHARLES A., M. D.	612 Congress St., Portland, Me.	1912
	EBERSOLE, WILLIAM G., M. D.	800 Schofield Bldg., Cleveland, Ohio	1914
*†	EDDY, HARRISON P.	14 Beacon St., Boston, Mass.	1910
†	EDMISON, JOHN H., M. D.	216 Thirteenth St., Brandon, Man.	1913
	PROV. MED. OFFICER OF HEALTH.	Edmonton, Alta.	1915
	EDSALL, FRANK H., M. D.	City Health Bureau, Jersey City, N. J.	1914
†§	EDWARDS, JAMES F., M. D.	Bureau of Infectious Diseases, Pittsburgh, Pa.	1907
*†	EDWARDS, MARTIN R., M. D.	7 Marlborough St., Boston, Mass.	1914
	EISENBERG, ARTHUR A., M. D.	1708 Third St., North West, Washington, D. C.	1915
*	ELGIN, W. F., M. D.	City Health Board, Glenolden, Pa.	1900
	ELLISON, J. AUSTIN.	6th and King Sts., Wilmington, Del.	1915
**	ELLIOTT, RALPH W., M. D.	10509 Euclid Ave., Cleveland, Ohio	1915
	ELIZ. McCORMICK, MEM. FUND.	315 Plymouth Ct., Chicago, Ill.	1915
	ELMORE, CHARLES G., M. D.	Room 312, C. & N. W. Terminal, Chicago, Ill.	1915
*	ELMS, J. W.	2812 Madison Rd., Cincinnati, Ohio	1897
	ELWOOD, E. S.	The Capitol, Albany, N. Y.	1915
†	EMERSON, CHARLES A., JR.	State Health Board, Harrisburg, Pa.	1907
	EMERSON, GUY C.	5 Agassiz Park, Boston, Mass.	1914
†§	EMERSON, HAVEN, M. D.	120 East 62d St., New York City	1914
*†	EMERSON, HERBERT C., M. D.	145 Chestnut St., Springfield, Mass.	1899
	ENGEL, P. W.	38 South Dearborn St., Chicago, Ill.	1916
	ERNST, HAROLD C., M. D.	Harvard Medical School, Boston, Mass.	1915
	ESCOTO, FRED G., M. D.	113 Independence St., Mantanzas, Cuba	1911
†	ESTABROOK, ARTHUR F.	15 State St., Boston, Mass.	1909
	EVANS, E. GEO.	522 Van Dyke St., Detroit, Mich.	1915
§	EVANS, E. WALTER.	240 Oak St., Cincinnati, Ohio	1915
*	EVANS, H. D., M. D.	4 Lambard Ct., Augusta, Me.	1905
*†§	EVANS, WILLIAM A., M. D.	906 Tribune Bldg., Chicago, Ill.	1915
	EVERHARDY, JACOB L., M. D.	Axa Bldg., Leavenworth, Kan.	1913
	EYE, GEORGE EDWIN, M. D.	Marion, Kan.	1914
*	FABELA, OCTAVINO G., M. D.	10 De La Violeta, No. 8, Mexico, Mex.	1901
	FAHEY, EDWARD W., M. D.	217 New Jersey Bldg., Duluth, Minn.	1915
*	FALES, ALMON L.	15 Westbourne Rd., Newton Center, Mass.	1910
	FARNAM, PROF. HENRY WALCOTT.	43 Hillhouse Ave., New Haven, Conn.	1914
	FARKAS, MORRIS, M. D.	266 Watchung Ave., West Orange, N. J.	1915
	FARGUHAR, A. B.	York, Pa.	1880
§||	FARRAND, LIVINGSTON, M. D.	Univ. of Colorado, Boulder, Colo.	1910
	FEEZER, L. W.	5 Sumner Rd., Cambridge, Mass.	1915
	FEISS, PAUL L.	12600 Cedar Rd., Cleveland Heights, Ohio	1915
†	FELL, ALTON S., M. D.	312 East State St., Trenton, N. J.	1908
	FERGUSON, FRANKLIN A., M. D.	705 Congress St., Portland, Me.	1912
	FERGUSON, HARRY F.	State Water Survey, Urbana, Ill.	1916
	FERNANDO, MONTILLA J.	Ayuntamiento Bldg., San Juan, Porto Rico	1915
*	FERRY, N. S., M. D.	430 Montclair Ave., Detroit, Mich.	1910
†	FETHERSTON, JOHN T.	16 Lenox Pl., New Brighton, N. Y.	1914
	FIEDLER, OTHO, M. D.	Sheboygan, Wis.	1913
†	FINCH, JAMES H., M. D.	101 North Elm St., Champaign, Ill.	1914
	FINIGAN, MRS. ELIZABETH M.	42 Phelps St., Lyons, N. Y.	1915
||	FINLEY, CARLOS E., M. D.	Havana, Cuba	1911

FISH, LEWIS, M. D.	86 Day St., Fitchburg, Mass.	1915
FISHBURNE, SKOTTOWE B., M. D.	1400 Hampton St., Columbia, S. C.	1915
†FISHER, E. A.	Rochester, N. Y.	1915
†§FISHER, PROF. IRVING	New Haven, Conn.	1903
FISHER, SEAVER Z., M. D.	Jamestown St., Randolph, N. Y.	1915
§FISK, EUGENE LYMAN	25 West 45th St., New York City	1915
*§FISKE, C. N., M. D.	Navy Dept., Washington, D. C.	1910
FITCH, CLIFFORD P.	107 Brandon Pl., Ithaca, N. Y.	1915
*FITZGERALD, PROF. J. G.	Univ. of Toronto, Toronto, Ont.	1912
FITZGERALD, JAMES O., M. D.	1110 Capitol St., Richmond, Va.	1914
*FITZ-RANDOLPH, R. B., M. D.	17 State St., Trenton, N. J.	1905
FLANAGAN, EDWARD L., M. D.	Emporia, Va.	1915
FLANARY, DAVID L., M. D.	1027 Troy St., Dyersburg, Tenn.	1914
FLEMING, MISS GEORGIA ELIZABETH	1107 West Oregon St., Urbana, Ill.	1914
FLICK, LAWRENCE F., M. D.	732 Pine St., Philadelphia, Pa.	1890
FLINN, THOS. W. P., M. D.	84 Morris St., Halifax, N. S.	1915
*FLOCKEN, CHARLES F., D. V. M.	2624 Emerson Ave., South, Minneapolis, Minn.	1904
FLOYD, MELDRUM B., M. D.	471 Forest Ave., Dayton, Ohio	1915
FOLEY, MISS EDNA L.	104 South Michigan Ave., Chicago, Ill.	1915
||FOLKS, HOMER	428 Hawthorne Ave., Yonkers, N. Y.	1911
FOLLIN, JAMES W.	621 Oakland Bldg., Lansing, Mich.	1914
†FOLSOM, WILLIAM C.	2523 Essex Pl., Cincinnati, Ohio	1911
*FOOTE, CHARLES J., M. D.	60 Elm St., New Haven, Conn.	1895
*FORBES, F. B.	540 State House, Boston, Mass.	1905
FORCE, PROF. J. N.	Univ. of California, Berkeley, Cal.	1911
††FORD, C. E., M. D.	Care General Chemical Co., 25 Broad St., New York City	1910
†FORT, A. G., M. D.	Tifton, Ga.	1911
FOSTER, HARRY E., M. D.	609 Santa Ray Ave., Oakland, Cal.	1915
FOSTER, R. F., M. D.	29 North Portage St., Westfield, N. J.	1915
†FOSTER, W. BROWNLEY, M. D.	Roanoke, Va.	1908
FOSTER, PROF. WILLIAM TRUMBOWER	707 Coleman St., Easton, Pa.	1916
FOX, CARROLL, M. D.	Hygienic Laboratory, 25th and E Sts., Washington, D. C.	1915
*FOX, HERBERT, M. D.	3209 Locust St., Philadelphia, Pa.	1915
||FOX, H. F.	50 Union Sq., New York City	1911
FOX, RICHARD T.	20 East Goethe St., Chicago, Ill.	1916
FOYLE, TIMOTHY F.	353 Warren St., Newark, N. J.	1914
FRANCINE, A. P., M. D.	264 South 21st St., Philadelphia, Pa.	1915
FRANCIS, WALTER J.	260 St. James St., Montreal, Que.	1914
FRANK, LESLIE C., Hygienic Laboratory, 25th and E Sts., North West, Washington, D. C.		1914
§FRANKEL, LEE K., PH. D.	1 Madison Ave., New York City	1909
FRANKFORTER, G. B., M. D.	525 River Rd., South East, Minneapolis, Minn.	1915
†FRANTZ, A. E., M. D.	504 Delaware Ave., Wilmington, Del.	1909
*FREAS, RAYMOND	1418 Linden Ave., Baltimore, Md.	1913
*†§FREEMAN, A. W., M. D.	U. S. P. H. Service, Cincinnati, Ohio	1907
FRENCH, FRANK E.	4907 Stewart Ave., Cincinnati, Ohio	1914
†§FRIEDRICH, MARTIN, M. D.	3226 West 14th St., Cleveland, Ohio	1905
FRICKS, L. D.	Hygienic Laboratory, Washington, D. C.	1915
*FRITZE, LUCIAS A.	City Y. M. C. A., Moline, Ill.	1913
†FRONCZAK, FRANCIS E., M. D.	Health Dept., Buffalo, N. Y.	1910
*FROST, WILLIAM D.	310 North Orchard St., Madison, Wis.	1904
*FROST, W. H., M. D.	3d and Kilgour Sts., Cincinnati, Ohio	1909
FUERTES, JAMES H.	140 Nassau St., New York City	1913

*FULLER, CALEB A.	71 Charles Field St., Providence, R. I.	1905
*†FULLER, GEORGE W.	170 Broadway, New York City	1892
*§FULTON, J. S., M. D.	16 North Saratoga St., Baltimore, Md.	1897
FURBUSH, C. L., M. D.	1501 Spruce St., Philadelphia, Pa.	1911
FURMAN, DAVIS, M. D.	Greenville, S. C.	1914
FURNISS, HENRY W., M. D.	American Legation, Port Au Prince, Hayti	1900
†FURSTMAN, JACOB W.	City Hall, La Crosse, Wis.	1912
GABLE, ISAAC C., M. D.	46 South Beaver St., York, Pa.	1897
*†GAGE, S. DE M.	310 State House, Providence, R. I.	1901
*GAINES, RICHARD H.	49 Lafayette St., New York City	1909
GALE, GEORGE B., M. D.	457 Mt. Prospect Ave., Newark, N. J.	1909
GALLIVAN, WILLIAM J., M. D.	743 Broadway, South Boston, Mass.	1912
GARCIA, ALEXANDER, M. D.	2000 Arch St., Philadelphia, Pa.	1915
†§GARCIA, CARLOS M., M. D.	36 Zamora St., Vera Cruz, Mex.	1909
GARCIA, MANUEL C. Y., M. D.	26 Eighth St., Havana, Cuba	1915
GARRISON, IRA M., M. D.	East Greenbush, N. Y.	1915
*GAUB, JOHN	2701 North Capitol St., Washington, D. C.	1912
GAVITT, ANDREW J.	151 North Ave., Plainfield, N. J.	1915
†GEBHARDT, FREDERICK H., M. D.	43 Washington St., Rutland, Vt.	1914
*GEHRMANN, ADOLPH, M. D.	3815 Ellis Ave., Chicago, Ill.	1895
*GEIDEL, CARL D.	Chem. Bldg., Univ. of Wisconsin, Madison, Wis.	1914
GEIER, OTTO P., M. D.	Cincinnati Milling Machine Co., Oakley, Cincinnati, Ohio	1916
GEORGE, W. EGERTON, M. D.	North Bay, Ont.	1912
†GERHARD, WILLIAM P., M. D.	Forty-second St. Bldg., New York City	1880
GERMER, HERMANN G.	221 North Main St., Canastota, N. Y.	1915
†GERY, CHAS. G.	5336 Wingohocking Ter., Germantown, Pa.	1910
GIESE, OTTO ERICH	4 and 6 Cedar St., New York City	1915
GILLES, DEWITT CLINTON	City Hall, Savannah, Ga.	1914
GILLESPIE, C. G.	Univ. of California, Berkeley, Cal.	1915
GILLESPIE, JULIAN M., M. D.	163 Dryades St., New Orleans, La.	1915
†GILLETTE, OMER R., M. D.	7 Bank Bldg., Colorado Springs, Colo.	1912
GILLEYLEN, J. D., M. D.	Jackson, Miss.	1916
**†GILLIHAN, ALLEN F., M. D.	Oakland, Cal.	1913
*GILLILAND, S. H., M. D.	Marietta, Pa.	1900
GILTNER, PROF. WARD	340 Oak Hill Ave., East Lansing, Mich.	1914
GLADDING, RAYMOND D.	Gladding Pl., Fall River, Mass.	1915
†GLENN, JOHN M.	130 East 22d St., New York City	1910
§GLOVER, JAMES W.	620 Oxford Rd., Ann Arbor, Mich.	1914
†§GODFREY, EDWARD S., JR., M. D.	211 Goodrich Bldg., Phoenix, Ariz.	1910
†GODFREY, HOLLIS	Drexel Institute, 32d and Chestnut Sts., Philadelphia, Pa.	1913
*GOLDBERGER, JOS., M. D.	25th and E Sts., Washington, D. C.	1909
†GOLDWATER, S. S., M. D.	Mt. Sinai Hospital, New York City	1902
*†GOLER, G. W., M. D.	173 Alexander St., Rochester, N. Y.	1900
†GOLTMAN, M., M. D.	410 Union Ave., Memphis, Tenn.	1912
†GOODELL, JOHN MILTON	106 Lorraine Ave., Upper Montclair, N. J.	1912
†GOODNOUGH, X. H.	State House, Boston, Mass.	1914
†§GORDON, JAMES R.	Deputy State Registrar, Raleigh, N. C.	1909
**†GORDON, JOHN BOYLE	235 Elm St., Buffalo, N. Y.	1914
*GORDON, R. I.	1301 Florida Ave., Tampa, Fla.	1914
*GORHAM, FRED P.	Brown University, Providence, R. I.	1899

†GORTER, NATHAN R., M. D.	1 West Biddle St., Baltimore, Md.	1914
GOULD, CHARLES M., M. D.	City Health Officer, Superior, Wis.	1914
†GOULD, WILLIAM H.	Lucas County Court House, Toledo, Ohio	1913
*GOVERS, FRANK X.	Chemists' Club, New York City	1914
*GRAF, A. V.	3837 Wyoming St., St. Louis, Mo.	1914
GRAHAM, DOUGLAS S.	5336 Willis Ave., Dallas, Tex.	1916
** †|| GRAHAM-ROGERS, C. T.	381 Fourth Ave., New York City	1912
†§GRAM, FRANKLIN C., M. D.	849 Humboldt St., Buffalo, N. Y.	1907
GRANDFIELD, ROBERT E.	124 Brown Ave., Roslindale, Mass.	1915
§GRANDY, CHARLES R., M. D.	101 Free Mason St., Norfolk, Va.	1907
†GRANT, WILLIAM.	2420 R St., Lincoln, Neb.	1913
†§GRASSICK, JAMES, M. D.	Grand Forks, N. D.	1910
GRAVES, E. E., M. D.	14 Elm St., Penacook, N. H.	1886
GRAVES, KENNETH D.	City Hall, Richmond, Va.	1914
GRAY, GEORGE M.	286 Third St., Cambridge, Mass.	1914
GRAY, H. F.	208 Ramona Bldg., Palo Alto, Cal.	1911
†GRAY, SAMUEL M.	10 Weybosset St., Providence, R. I.	1891
GRAY, THOMAS N., M. D.	William and Plane Sts., Newark, N. J.	1916
†GREELEY, SAMUEL A.	200 Chestnut St., Winnetka, Ill.	1912
GREEN, FREDERICK R., M. D.	535 North Dearborn St., Chicago, Ill.	1915
*†GREEN, F. W.	Little Falls, N. J.	1915
GREENBERG, D.	Yale School of Medicine, New Haven, Conn.	1914
*GREENFIELD, MISS MYRTLE.	1244 Louisiana St., Lawrence, Kan.	1913
GREGORY, CHARLES E.	100 West Main St., Mt. Kisco, N. Y.	1915
†GREGORY, JOHN H.	170 Broadway, New York City	1912
GRIFFIN, CHAS. A.	Dept. of Health, Eastman Park Laboratory, Poughkeepsie, N. Y.	1915
GRIMM, RANDOLPH M., M. D.	U. S. P. H. Service, Spartanburg, S. C.	1915
*GRINDLY, PROF. HARRY S.	Urbana, Ill.	1910
*GRINNELL, FRANCIS B., M. D.	240 Longwood Ave., Boston, Mass.	1914
*GRISWOLD, DON M.	Antigua, B. W. I.	1914
GROSSMAN, GAISSON.	506 Central Ave., Rochester, N. Y.	1915
GRUBBS, SAMUEL B., M. D.	15 Strathmore Rd., Brookline, Mass.	1902
GRUENER, PROF. HIPPOLYTE.	2089 Cornell Rd., Cleveland, Ohio	1914
§GUILFOY, W. H., M. D.	141 Center St., New York City	1907
GUITERAS, JUAN, M. D.	Las Animas Hospital, Havana, Cuba	1902
§GUITERAS, RAMON, M. D.	80 Madison Ave., New York City	1904
*GUNDRUM, FREDERICK F., M. D.	1023 Tenth St., Sacramento, Cal.	1913
GUNN, MRS. SELSKAR M.	60 Goden St., Belmont, Mass.	1915
*†GUNN, PROF. SELSKAR M.	60 Goden St., Belmont, Mass.	1905
*HACHTEL, F. W., M. D.	122 West Lafayette St., Baltimore, Md.	1909
HAGAN, JAMES J.	331 Baldwin Ave., Jersey City, N. J.	1916
*HAINE, WILLIAM.	11 Laurel St., Hartford, Conn.	1914
HALE, FRANK E.	Mt. Prospect Laboratory, Flatbush Ave. and Eastman PK'y, Brooklyn, N. Y.	1916
HALL, E. P., M. D.	Skaneateles, N. Y.	1915
HALL, HARRY R.	16 West Saratoga St., Baltimore, Md.	1915
HALL, JOHN.	441 Main St., East Orange, N. J.	1914
†§HALL, PEARL M., M. D.	1067 Freemont Ave., Minneapolis, Minn.	1908
†HALSEY, WILLIAM H., M. D.	Washington, D. C.	1911
*||HAMILTON, ALICE, M. D.	1312 Park Ave., Baltimore, Md.	1913

*HAMILTON, HERBERT C.	Care Parke Davis & Co., Detroit, Mich.	1913
HAMLIN, FRED E., M. D.	Stanton, Va.	1916
†HAMMER, B. W.	Iowa State College, Ames, Iowa	1909
HAMNER, N. C.	Municipal Bldg., Dallas, Tex.	1915
HAND, E. ALEXANDER, M. D.	35 Townsend St., Walton, N. Y.	1915
HANFORD, OLIVER P., M. D.	720 North Nevada Ave., Colorado Springs, Colo.	1913
HANOR, WELCOME A., M. D.	118 East Erie Ave., Corning, N. Y.	1915
*HANSON, HENRY, M. D.	317 West 10th St., Jacksonville, Fla.	1910
*†HANSEN, PAUL	State Health Board, Engineering Bureau, Springfield, Ill.	1905
*HARDING, H. A.	College of Agriculture, Urbana, Ill.	1908
HARDY, W. J., M. D.	3 South St., Belmont, N. Y.	1915
HARLEY, MARY, M. D.	Sweet Briar College, Sweet Briar, Va.	1914
HARMON, GAUS E., M. D.	Western Reserve University, 1353 East 9th St., Cleveland, Ohio	1914
§HARPER, C. A., M. D.	15 Pickney St., Madison, Wis.	1904
HARPER, ELMER E.	2404 East 30th St., Kansas City, Mo.	1915
HARRINGTON, FRANCIS E., M. D.	1106 P St., North West, Washington, D. C.	1910
HARRIS, CUMMINGS, M. D.	City Health Dept., Memphis, Tenn.	1915
†HARRIS, D. L., M. D.	Metropolitan Bldg., St. Louis, Mo.	1908
HARRIS, HENRY F., M. D.	State Health Board, Atlanta, Ga.	1914
**HARRIS, LOUIS I., M. D.	1855 Seventh Ave., New York City	1915
*HARRIS, NORMAN MACL., M. B.	Univ. of Chicago, Chicago, Ill.	1899
HARRISON, SAMUEL CHARLES	1350 Liberty St., Jacksonville, Fla.	1914
HARRISON, SHELBY M.	130 East 22d St., New York City	1915
†HARTE, RICHARD H., M. D.	1503 Spruce St., Philadelphia, Pa.	1914
HART, W. L.	Madison Barracks, New York City	1916
§HARTLOFF, CHAS. W., M. D.	Room 313, Int. Life Bldg., Evansville, Ind.	1913
HARTZELL, JOSIAH	Canton, Ohio	1895
HARVEY, P. W.	4608 Euclid Ave., Cleveland, Ohio	1912
HASKELL, W. A., M. D.	Alton, Ill.	1883
†HASKINS, CHARLES A.	1732 Mississippi St., Lawrence, Kan.	1913
HASSELLTINE, H. E., M. D.	Hygienic Laboratory, Washington, D. C.	1916
†HASTINGS, CHAS J., M. D.	Municipal Bldg., Toronto, Ont.	1911
*HASTINGS, PROF. EDWIN G.	College of Agriculture, Madison, Wis.	1913
HASTINGS, GEORGE A.	105 East 22d St., New York City	1915
§||HATFIELD, CHARLES J., M. D.	2008 Walnut St., Philadelphia, Pa.	1913
HATTIE, W. H., M. D.	Halifax, N. S.	1913
HATTON, EDWARD H.	151 Fifth St., La Salle, Ill.	1915
†HATTON, THOMAS C.	City Hall, Milwaukee, Wis.	1910
*HAUSER, STEPHEN J.	1669 Cedar Ave., Cincinnati, Ohio	1914
HAWFORD, PETER O., M. D.	720 North Nevada Ave., Colorado Springs, Colo.	1915
HAYES, E. S., M. D.	603 Third Ave., Eau Claire, Wis.	1915
HAYES, OSCAR, M. D.	Majestic Bldg., Denver, Colo.	1913
*HAYES, W. D.	State Health Board, Jacksonville, Fla.	1914
**†HAYHURST, EMERY R., M. D.	State Health Board, Columbus, Ohio	1913
§HAYNE, JAMES A., M. D.	Palmetto Bldg., Columbia, S. C.	1911
†HAZLEHURST, GEORGE H.	Municipal Bldg., Chattanooga, Tenn.	1913
†||HAZLEHURST, JAMES N.	Municipal Bldg., Chattanooga, Tenn.	1912
*†HAZEN, ALLEN	Forty-second St. Bldg., New York City	1892
†HEARD, JAMES D., M. D.	6101 Pennsylvania Ave., Pittsburgh, Pa.	1915
†§HECKARD, M. D., M. D.	5416 Wayne Ave., Chicago, Ill.	1907
HEDGES, B. VAN D., M. D.	703 Natchung Ave., Plainfield, N. J.	1907
HEFFRON, JOHN L., A. M., M. D., Sc.D.	1014 James St., Syracuse, N. Y.	1915

*HEINEMANN, P. G., M. D.	Univ. of Chicago, Chicago, Ill.	1906
HEISER, VICTOR G., M. D.	61 Broadway, New York City	1913
HEKTOEN, LUDVIG, M. D.	637 South Wood St., Chicago, Ill.	1915
HENDERSON, ANDREW, M. D.	Powell River, Vancouver, B. C.	1915
HENRY, C. P., M. D.	846 Center Ave., Reading, Pa.	1914
HENSON, GRAHAM E.	St. James Bldg., Jacksonville, Fla.	1914
†HERBERT, THOMAS G.	1906 Sixteenth St., Altoona, Pa.	1909
†HERING, RUDOLPH G.	170 Broadway, New York City	1878
*HERMS, WILLIAM B.	1424 Le Roy Ave., Berkeley, Cal.	1912
HERNDON, R. F., M. D.	727 Kress Bldg., Houston, Tex.	1916
HERRING, ROBERT A., M. D.	U. S. Marine Hospital, Louisville, Ky.	1915
*HESS, ALFRED F., M. D.	Box 262, Elberon, N. J.	1913
||HIBBARD, MISS MARY E.	Linea 49 Vedado, Havana, Cuba	1912
HICKMAN, W. W., M. D.	Noxapater, Miss.	1916
*HIDY, KLORE WILLIAM, M. D.	231½ South Vermont Ave., Los Angeles, Cal.	1913
†HIGGINS, LAFAYETTE.	1144 West 25th St., Des Moines, Iowa	1913
†HILL, G. EVERETT.	156 Fifth Ave., New York City	1897
*HILL, HERBERT M., M. D.	20 West Eagle St., Buffalo, N. Y.	1914
*†HILL, HIBBERT W., M. D.	Institute of Public Health, London, Ont.	1896
HILL, JAMES SUTCLIFFE, M. D.	Main St., Bellows Falls, Vt.	1916
HILL, PROF. JOHN EDW.	Brown University, Providence, R. I.	1902
HILL, JOHN W.	First Nat. Bank Bldg., Cincinnati, Ohio	1896
*†HILL, NICOLAS S., JR.	100 William St., New York City	1910
*HILLIARD, PROF. C. M.	87 Middle St., Braintree, Mass.	1911
HINDMAN, S. S., M. D.	St. Vincent's Hospital, Toledo, Ohio	1913
HINDS, M. E.	State Food and Drugs Lab., Nashville, Tenn.	1914
HISCOCK, IRA V.	32 Brainerd Ave., Middletown, Conn.	1915
HITCHCOCK, JOHN S., M. D.	160 Main St., Northampton, Mass.	1915
HITCHENS, A. PARKER, M. D.	Glenolden, Pa.	1907
HIXON, MISS JESSIE M.	104 Livingston St., Brooklyn, N. Y.	1915
†HOAD, PROF. WILLIAM C.	328 East Huron St., Ann Arbor, Mich.	1913
HOCHSTADTER, IRVING.	227 Front St., New York City	1915
†§HOFFMAN, FREDERICK L.	761 Broad St., Newark, N. J.	1907
†HOFFMAN, J. D.	Station A, Lincoln, Neb.	1912
HOFFMAN, GEO. L., PH.D.	321 Fourth St., Logansport, Ind.	1915
HOLCOMBE, FRANK M., M. D.	Main St., Keeseville, N. Y.	1915
*||HOLDEN, G. W., M. D.	Agnes Memorial Sanatorium, Denver, Colo.	1913
HOLDREDGE, LEIGH I.	66 West 9th St., New York City	1915
HOLLIS, LAWRENCE W., M. D.	10th and Chestnut Sts., Abilene, Tex.	1916
*HOLM, MARINUS L., M. D.	913 Allegan St., Lansing, Mich.	1908
HOLMES, CHRISTIAN R., M. D.	10 East 8th St., Cincinnati, Ohio	1916
*HOLT, W. L., M. D.	Maplewood, N. J.	1914
HOLTE, HALVOR, M. D.	Crookston, Minn.	1914
HOLWAY, ALVAH S., A. B., S. B.	218 West Ely St., Alliance, Ohio	1915
*†HOMMON, HARRY B.	3d and Kilgour Sts., Cincinnati, Ohio	1910
HOOD, CHARLES H.	494 Rutherford Ave., Boston, Mass.	1913
*HOOVER, CHARLES P.	230 East 18th Ave., Columbus, Ohio	1910
HOPKINS, ERASMUS G.	Glen Allen, Va.	1914
HORAN, C. F.	Box 86, Watertown, Mass.	1915
*†HOROWITZ, MURRAY P.	9 Newbury St., Boston, Mass.	1914
HORTMANN, HENRY C., M. D.	519 Thirteenth St., Galveston, Tex.	1914

HORTON, SOTON	524 West 57th St., New York City	1915
*†HORTON, THEODORE	State Health Dept., Albany, N. Y.	1912
*HOUGHTON, E. M., M. D.	130 Longfellow Ave., Detroit, Mich.	1911
HIRAM HOUSE, THE	2723 Orange Ave., Cleveland, Ohio	1915
†HOWARD, CHARLES D.	State Laboratory of Hygiene, Concord, N. H.	1913
HOWARD, NORMAN J.	Filtration Plant Laboratory, Dept. of Health, City Hall, Toronto, Ont.	1912
HOWD, SALMON G., M. D.	153 Main St., Winsted, Conn.	1916
HOWE, WILLIAM AUGUSTUS, M. D.	State Education Dept., Albany, N. Y.	1912
HOWELL, WILLIAM O.	4310 Pine St., Philadelphia, Pa.	1915
HOWK, HORACE JOHN, M. D.	Mt. McGregor, N. Y.	1915
HOWLAND, C. A.	283 Hudson Ave., Albany, N. Y.	1914
*†HOYT, R. N.	317 Ash St., Manchester, N. H.	1913
HOXSIE, B. K., JR.	Sherwood, N. Y.	1915
HUBBARD, LE ROY W., M. D.	137 Primrose Ave., Mt. Vernon, N. Y.	1914
HUBBELL, CLARENCE W.	2334 Dime Bank Bldg., Detroit, Mich.	1915
*HUCKLE, CLARENCE	15 Todd Pl., North East, Washington, D. C.	1913
HUDSON, JESSIE B., M. D.	510 Wilson Bldg., Clinton, Iowa	1912
HUEBSCH, LEO A., M. D.	Hamburg, Pa.	1915
HULL, HOWARD L., M. D.	State Dept. of Health, Harrisburg, Pa.	1916
*HUMPHREY, HENRY C.	17 Battery Pl., New York City	1912
HUNT, RALPH H., M. D.	29 Harrison St., East Orange, N. J.	1914
HUNTER, HENRY G.	619 New Birke Bldg., Montreal, Que.	1914
HURD, HENRY M., M. D.	1023 St. Paul St., Baltimore, Md.	1906
†§HURTY, J. N., M. D.	29 East 2d St., Indianapolis, Ind.	1896
†HUTCHINSON, WOODS, M. D.	Hotel Marseilles, 103d St. and Broadway, New York City	1912
HUTSHING, EDWIN E.	1013 Joshua Green Bldg., Seattle, Wash.	1914
†HYDE, PROF. CHAS. G.	Univ. of California, Berkeley, Cal.	1905
†IGLESIAS, MANUAL S., M. D.	Vera Cruz, Mex.	1900
IHLDER, JOHN	704 Union Trust Bldg., Washington, D. C.	1915
INGHAM, E. A.	Mass. Inst. Tech., Boston, Mass.	1914
INTERNATIONAL HEALTH COMMISSION	61 Broadway, New York City	1913
IRWIN, RALPH E.	Penna. Dept. of Health, Harrisburg, Pa.	1914
IZLAR, A. L., M. D.	Ocala, Fla.	1914
*†JACKSON, DANIEL D.	Columbia University, 116th St., New York City	1899
JACKSON, ELMER C., M. D.	622 Fourth Ave., Ashland, Wis.	1913
†JACKSON, J. FREDERICK	1174 Whitney Ave., Whitneyville, Conn.	1914
JACKSON, JAMES M., M. D.	1115 Ave. B, Miami, Fla.	1914
||JACOBS, PHILIP P., PH. D.	105 East 22d St., New York City	1912
†JACOBSEN, JOAQUIN, M. D.	Monseratte 2 St., Havana, Cuba	1911
JAMES, WALTER B., M. D.	17 West 54th St., New York City	1915
JAMESON, P. RICHARD	R. F. D., Highland Ave., Brighton, N. Y.	1915
JAMIESON, HEBER C.	Prov. Lab., Univ. of Alberta, Edmonton, Alta.	1916
*JENNINGS, FRED H.	1146 Boyd St., Watertown, N. Y.	1908
JENKINS, JAMES, JR.	69 Schermerhorn St., Brooklyn, N. Y.	1915
†JENKINS, HUBERT O.	750 Palo Alto Ave., Palo Alto, Cal.	1909
JENNINGS, MISS ANNIE B.	48 Park Ave., New York City	1915
JEPSON, S. L., A. M., Sc.D., M. D.	Capitol Bldg., Charleston, W. Va.	1915
JEWELL, ALBERT H.	445 East University Ave., Ann Arbor, Mich.	1916

REVISED LIST OF MEMBERS

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JOHNSON, E. KINGSLAND.....	Fishkill, N. Y.	1915
†JOHNSON, FRED, M. D.....	501½ Bellinger St., Eau Claire, Wis.	1914
*†JOHNSON, GEORGE A.....	150 Nassau St., New York City	1900
JOHNSON, MISS HELEN LOUISE.....	234 Paddock St., Watertown, N. Y.	1915
JOHNSON, MISS INGRID.....	1615 Foster Ave., Chicago, Ill.	1913
†JOHNSON, GEORGE B., M. D.....	407 East Grace St., Richmond, Va.	1909
JOLLES, WILLARD B., M. D.....	Orchard Park, N. Y.	1915
JOLLEY, WILLIAM F., M. D.....	Troupsburg, N. Y.	1915
JOLLS, WILLARD B., M. D.....	Orchard Park, N. Y.	1915
JONE, HUGO.....	P. O. Box 37, Station A, Brooklyn, N. Y.	1915
JONES, C. HAMPSON, M. D.....	2529 St. Paul St., Baltimore, Md.	1915
JONES, E. A., M. D.....	Cambridge, Md.	1915
*JONES, F. G.....	Care Ely Lilly & Co., Greenfield, Ind.	1914
*†JONES, GRANVILLE R.....	Johns Hopkins University, Baltimore, Md.	1909
*JONES, PROF. H. N.....	730 Wescott St., Syracuse, N. Y.	1912
JONES, JAMES C., M. D.....	Panama City, Fla.	1914
†JONES, LYMAN A., M. D.....	Swampscott, Mass.	1910
JONES, MYRON J.....	1779 Middlehurst Rd., Cleveland, Ohio	1914
JONES, WILLIAM A., M. D.....	142 Main St., Aurora, Ill.	1913
†JONES, WILLIAM A., M. D.....	513 Pillsbury Bldg., Minneapolis, Minn.	1910
*JORDAN, EDWIN O.....	Univ. of Chicago, Chicago, Ill.	1899
JORDAN, G. A., M. D.....	St. Louis, Mo.	1911
*†JORDAN, HARRY E.....	113 Monument Pl., Indianapolis, Ind.	1904
*†JORDAN, JAMES O.....	1104 City Hall Annex, Boston, Mass.	1905
†JORDAN, THOMAS, M. D.....	City Health Board, Boston, Mass.	1902
JOSLIN, ROYAL KNIGHT.....	129 Blackstone Blvd., Providence, R. I.	1916
†JURIST, B.....	19 Park Pl., New York City	1904
†KASTENHUBER, E. G., JR.....	P. O. Box 362, Easton, Md.	1912
KAY, HARRY M., M. D.....	827 University Ave., Madison, Wis.	1914
†§KEAN, JEFFERSON R., M. D.....	1624 H St., North West, Washington, D. C.	1909
KEISTER, WM. S., M. D.....	State Board of Health, Richmond, Va.	1915
KEITH, SIMEON C., JR.....	138 Lancaster Pl., Brookline, Mass.	1912
KELLERMAN, KARL F.....	Bureau Plant Industry, U. S. Dept. Agriculture, Washington, D. C.	1907
KELLERT, ELLIS, M. D.....	Bender Hygienic Laboratory, Albany, N. Y.	1915
†§KELLEY, EUGENE R., M. D.....	41 Egremont Rd., Boulevard Station, Boston, Mass.	1912
*†KELLEY, J. B., M. S.....	City Board of Health, Detroit, Mich.	1915
KELLOGG, J. H., M. D.....	Battle Creek, Mich.	1878
KELLEY, FRANK L., M. D.....	2241 Parker St., Berkeley, Cal.	1916
KENASTON, H. R., M. D.....	Bonesteel, S. D.	1913
KENDRICK, ARTHUR.....	23 Church St., Cambridge, Mass.	1912
†§KENNEDY, JOHN PAYSON, M. D.....	City Hall, Atlanta, Ga.	1909
KENNEDY, STEPHEN, R. M.....	Blount Bldg., Pensacola, Fla.	1914
KENTUCKY AGRICULTURAL EXPERIMENT STATION.....	Lexington, Ky.	1914
*KERR, JOHN WALTER, M. D.....	410 Girard St., North West, Washington, D. C.	1909
KERRIHAN, SAMPLE B.....	807 Gay St., Portsmouth, Ohio	1915
†KIDDER, F. THOMAS.....	State Health Board, Woodstock, Vt.	1907
†KIEFER, GUY L.....	Detroit, Mich.	1907
KIESERLING, ROBERT H.....	Gano Ave., Clifton, Cincinnati, Ohio	1915
†KILBOURNE, CHARLES H.....	556 West 186th St., New York City	1912
KILMARTIN, THOMAS J., M. D.....	City Hall, Waterbury, Conn.	1916

KILMER, FRED B.	147 College Ave., New Brunswick, N. J.	1906
†KIMBALL, D. D.	15 West 38th St., New York City	1912
KING, MISS MYRTLE E.	401 Court House, Minneapolis, Minn.	1916
*†KING, W. E., M. D.	Research Dept., Parke Davis & Co., Detroit, Mich.	1910
||KINGSLEY, SHERMAN C.	315 Plymouth Ct., Chicago, Ill.	1912
KINNAIRD, R. N.	833 West 15th St., Des Moines, Iowa	1915
*†KINYOUN, J. J., M. D.	1423 Clifton St., North West, Washington, D. C.	1902
KIRKWOOD, R. C., M. D.	Box 9, Sante Fe, N. M.	1915
§KIRSCHBAUM, WM. G.	New Bedford, Mass.	1915
KISTLER, J. M., M. D.	148 Highland Ave., Minneapolis, Minn.	1913
††KLEIN, ALVIN W., M. D.	65 West Putnam St., Greenwich, Conn.	1909
†KLEIN, WM. I.	313 Interstate Bldg., Kansas City, Mo.	1914
*KLIGLER, ISRAEL J., M. D.	824 East 165th St., Bronx, N. Y.	1912
*KLOTZ, OSKAR, M. D.	Univ. of Pittsburgh, Pittsburgh, Pa.	1912
KNIGHT, I. W., M. D.	Somerton St., Philadelphia, Pa.	1916
KNIGHT, JOHN C.	Plant City, Fla.	1914
†KNOPF, S. A., M. D.	16 West 95th St., New York City	1906
*†KNOWLES, M. MORRIS	Bureau of Filtration, Pittsburgh, Pa.	1901
KNOWLTON, MILLARD, M. D.	78 North Clinton Ave., Trenton, N. J.	1915
†KNOWLTON, W. T.	1632 South Van Ness Ave., Los Angeles, Cal.	1913
KNOX, S. B. P., M. D.	914 Anacapa St., Santa Barbara, Cal.	1892
***†§KOBER, GEORGE M., M. D.	1819 Q St., North West, Washington, D. C.	1896
KOEHLER, G.	2750 North Kimball Ave., Chicago, Ill.	1915
*KONRAD, EDMUND C., M. D.	1900 West 25th St., Cleveland, Ohio	1915
||§KOPF, EDWIN W.	1 Madison Ave., New York City	1913
KORNEMANN, H. A., M. D.	262 Fifteenth Ave., Newark, N. J.	1904
KRESS, DANIEL H., M. D.	5 Pine Ave., Takoma Park, Washington, D. C.	1915
KRUM, HARRY J.	1230 Union St., Allentown, Pa.	1916
KRUMWIEDE, CHARLES, JR., M. D.	15 Hobart St., Bronxville, N. Y.	1914
KURK, FRED W.	817 Rubel Ave., Louisville, Ky.	1913
KURTZ, H. T., M. D.	Highland Falls, N. Y.	1915
||§KUSEL, GEORGE C., M. D.	1831-1833 Chestnut St., Philadelphia, Pa.	1913
†§LA CHAPELLE, E. P., M. D.	9 St. James St., Montreal, Que.	1887
LADD, E. F.	Agriculture College, Fargo, N. D.	1912
LADD, HENRY A., M. D.	14 Beach St., Burlington, Vt.	1914
†LAFRENIERE, THEODORE J.	9 St. James St., Montreal, Que.	1912
||§LAKEMAN, CURTIS E.	25 West 45th St., New York City	1914
†LAMBERT, EDW. ALLYN.	1089 Broad St., Bridgeport, Conn.	1915
LAMBERT, HENRY F.	Batavia, N. Y.	1915
LA MONT, CHARLES A., M. D.	Canton, Ohio	1914
††LANDIS, JOHN H., M. D.	6 Crescent Pl., Cincinnati, Ohio	1910
LANE, C. GUY, M. D.	36 Pleasant St., Woburn, Mass.	1914
*LANAHAN, JOSEPH A., M. D.	161 Hamilton St., Albany, N. Y.	1915
LANCASTER, H. M.	Queen's Park, Toronto, Ont.	1915
LANE, FRANK B., M. D.	528 Main St., East Orange, N. J.	1915
LAPE, RUSHMORE, M. D.	203 West St., Fair Haven, Vt.	1916
LAPPIN, RICHARD CORCORAN	203 East Capitol St., Washington, D. C.	1912
LA RIEW, F. J., M. D.	City Health Board, Washington, D. C.	1914
*LARSON, ALFRED	Address unknown	1912
LATHAM, W. W.	Crockett, Tex.	1916
LATHROP, MISS JULIA C.	Children's Bureau, Washington, D. C.	1913

LATHRÔPE, THOMAS R.	Box 284, Shreveport, La.	1915
LATTA, S. W., M. D.	233 South 4th St., Philadelphia, Pa.	1915
LAUBAUGH, ERNEST E.	1122 East Jefferson St., Boise, Idaho	1914
†LAUGHLIN, WM. R., M. D.	2201 Estes Ave., Chicago, Ill.	1913
LAW, EDWIN AUGUSTUS, M. D.	Address unknown	1914
LAW, ROBERT, M. D.	190 Laurier Ave., East, Ottawa, Ont.	1915
LAWALL, CHARLES H.	39 South 10th St., Philadelphia, Pa.	1914
LEA, RICHARD S.	820 New Birks Bldg., Montreal, Que.	1907
*LEAKE, JAMES P., M. D.	Hygienic Laboratory, Washington, D. C.	1912
LEARY, JAMES H., M. D.	Rush, N. Y.	1915
†LEARY, MONTGOMERY E., M. D.	Iola Sanatorium, R. F. D. No. 2, Rochester, N. Y.	1910
†LEATHERS, WALLER S., M. D.	State Health Director, University, Miss.	1910
LE BOSQUET, MAURICE	506 West 69th St., Chicago, Ill.	1910
*LEBREDO, MARIA, M. D.	San Jose 99 Altos, Havana, Cuba	1911
*LEDERER, ARTHUR, M. D.	4123 Drexel Blvd., Chicago, Ill.	1908
LEDYARD, EDGAR M.	P. O. Box 1785, Salt Lake City, Utah	1915
LE FEBER, JOHN	130-140 Eighth St., Milwaukee, Wis.	1913
LELAND, ROSCOE G., M. D.	1545 Spruce Dr., Kalamazoo, Mich.	1913
LEMMER, G. E., M. D.	153 Main St., Danbury, Conn.	1916
L'ENGLE, E. M., M. D.	2756 St. Johns Ave., Jacksonville, Fla.	1914
LENNON, GEORGE T.	Haverhill, Mass.	1915
†LE PRINCE, JOSEPH	1820 State St., New Orleans, La.	1912
§LEROY Y CASSA, G., M. D.	Calle 10 No. 14, Altos-Vedado, Havana, Cuba	1911
LEVINE, PROF. MAX	Ames, Iowa	1914
LEVY, AARON G.	8417 Panola St., New Orleans, La.	1915
*†§LEVY, E. C., M. D.	Richmond, Va.	1904
||§LEWINSKI-CORWIN, E. H., PH. D.	17 West 43d St., New York City	1915
LEWIS, DWIGHT M., M. D.	36 High St., New Haven, Conn.	1907
LEWIS, F. PARK, M. D.	454 Franklin St., Buffalo, N. Y.	1907
*LEWIS, MALCOLM	4 Claremont Pl., Montclair, N. J.	1914
*LEWIS, PAUL A., M. D.	238 Pine St., Philadelphia, Pa.	1910
§LEWIS, RICHARD H., M. D.	Raleigh, N. C.	1892
LEWIS, PROF. WILLIAM E.	27 North 15th St., Allentown, Pa.	1916
LEWISOHN, ADOLPH	61 Broadway, New York City	1915
LICHTENBERG, H. F., A. C.	218 Riley St., Buffalo, N. Y.	1915
†LIGHT, ALVIN LUCIEN, M. D.	Dayton, Ohio	1914
†LINDSAY, WM. KINKADE, M. D.	1005 K St., Sacramento, Cal.	1913
LINECUM, ADDISON L.	Asst. State Health Officer, Galveston, Tex.	1915
LIPMAN, JACOB O., M. D.	Experiment Station, New Brunswick, N. J.	1910
LIPMAN, WILLIAM HENRY, M. D.	Care Swift & Co., Union Stock Yards, Chicago, Ill.	1915
*||LIPPINCOTT, LEON S., M. D.	8 Noble St., Brunswick, Me.	1914
LIPPITT, WILLIAM F., M. D.	San Juan, P. R.	1915
LIPPMAN, MARION H.	795 Sutter St., San Francisco, Cal.	1914
LOCHRIDGE, ELBERT E.	Springfield, Mass.	1905
LOCKE, ELISABETH, R. N.	220 West 7th St., Cincinnati, Ohio	1916
LOEB, BENJAMIN W.	25 North 11th St., Reading, Pa.	1914
*LONG, ALFRED G., M. D.	111 Middlegate St., Winnipeg, Man.	1909
LONG, WALTER S.	1116 Mississippi St., Lawrence, Kan.	1915
*†LONGFELLOW, ROBERT C., M. D.	1611 Twenty-second St., Toledo, Ohio	1910
*†LONGLEY, FRANCIS F.	Forty-Second St. Bldg., New York City	1906
LOONEY, R. N., M. D.	Boshford Block, Prescott, Ariz.	1913
LORD, MRS. FREDERICK T.	305 Beacon St., Boston, Mass.	1912

LOUGEE, LESTER B., M. D.	Marcella, N. Y.	1915
†LOUNSBURY, WM. C.	1518 Tower Ave., Superior, Wis.	1910
LOWE, D. B., M. D.	Dept. 38, B. F. Goodrich Co., Akron, Ohio	1915
LOWE, WM. HERBERT, D. V. S.	117 Trenton Ave., Paterson, N. J.	1906
LOWTHER, BURTON	3121 Park Ave., Kansas City, Mo.	1914
LUCIA, MILDRED H., R. N.	Mt. Washington Sanatorium, Eau Claire, Wis.	1916
LUDLOW, DAVID H., M. D.	244 Spring Garden St., Easton, Pa.	1915
†LUDLOW, J. L.	State Health Board, Winston-Salem, N. C.	1903
LUDWIG, ERNEST	The Leader-News Bldg., Cleveland, Ohio	1915
LUENING, FRED W.	663 Forty-ninth St., Milwaukee, Wis.	1914
LUMMIS, G. D., M. D.	501 South Main St., Middletown, Ohio	1916
*LUMSDEN, LESLIE L., M. D.	Hygienic Laboratory, U. S. P. H. S. and M. H. S., Washington, D. C.	1909
†LUSTER, ROBERT D., M. D.	Granite City, Ill.	1914
*LYALL, HAROLD WM., PH. D.	Research Antitoxin Laboratory, Otisville, N. Y.	1910
LYMAN, FRANCIS R., M. D.	Broadway, Hastings on Hudson, N. Y.	1915
LYSTER, MAJOR WM. JOHN	Room 338, War Dept., Washington, D. C.	1913
†|McBRAYER, SUPT. L. B., M. D.	State Tuberculosis Sanatorium, Sanatorium, N. C.	1914
McBRIDE, J. S., M. D.	811 Thirty-Fifth Ave., Seattle, Wash.	1916
*McBRYDE, C. N.	Dept. of Agriculture, Washington, D. C.	1910
†McCASKEY, DONALD, M. D.	24 West 59th St., New York City	1914
McCAUSTLAND, E. J., DEAN	School of Engineering, Univ. of Missouri, Columbia, Mo.	1914
McCLENAHAN, DANIEL A.	204 Herkimer St., Hamilton, Ont.	1912
McCLINTOCK, CHARLES T., M. D.	Asheville, N. C.	1908
McCLINTOCK, GEORGE	Overbrook, Kan.	1914
McCORMICK, L.	Asheville, N. C.	1915
McCRADY, MAC H.	9 St. James St., Montreal, Que.	1915
††McCRUDDEN, JAMES F.	5914 Pulaski Ave., Germantown, Philadelphia, Pa.	1914
*McCURDY, SIDNEY, M. D.	Youngstown Sheet & Tube Co., Youngstown, Ohio	1915
McCUSTION, ED. H.	136 North 18th St., Paris, Tex.	1916
McCULLOUGH, JOHN W. S., M. D.	Parliament Bldgs., Toronto, Ont.	1912
McDILL, JOHN R., M. D.	628 Astor St., Milwaukee, Wis.	1916
McDONALD, J. OLIVER, M. D.	190 West State St., Trenton, N. J.	1916
*McDONNELL, MILTON E., M. D.	2629 Broad Ave., Altoona, Pa.	1910
McDOWELL, JOHN R.	City Bldg., Springfield, Ohio	1915
*McFARLAND, JOSEPH, M. D.	447 Stafford St., Germantown, Pa.	1897
McFARLAND, ORIN S.	Tampa Water Works Co., Tampa, Fla.	1914
†McGEE, HAROLD	Corner Winthrop and Edwards Sts., Jackson, Mich.	1915
McGILL, ANTHONY	317 Queen St., Ottawa, Ont.	1910
†McGILL, PATRICK G., M. D.	1202 Tower St., Superior, Wis.	1909
||McGINNIS, R. H., M. D.	501 Laura St., Jacksonville, Fla.	1914
§McGLENEN, E. W.	100 Summer St., Boston, Mass.	1912
McGREGOR, TRACEY W.	239 Brush St., Detroit, Mich.	1915
McGUIRE, STUART, M. D.	513 East Grace St., Richmond, Va.	1909
McINERNEY, T. T.	Ithaca, N. Y.	1915
*McKAY, W. G.	47 West 10th St., Jacksonville, Fla.	1911
McKEE, MARK T.	937 Dime Bank Bldg., Detroit, Mich.	1915
†McKENZIE, T. H.	21 Berlin Ave., Southington, Conn.	1910
McKINLAY, JOHN F.	233 St. Antoine St., Detroit, Mich.	1915
McKINSTRY, JAMES F., JR., M. D.	205 West Main St., Gainesville, Fla.	1914
*McLAUGHLIN, ALLAN J., M. D.	State Health Dept., Boston, Mass.	1912

*McLAUGHLIN, GEORGE E., M. D.	41 Crescent Ave., Jersey City, N. J.	1901
MCLEAN, EPHRAIM R., M. D.	Cleveland, Miss.	1916
||MCLEAN, F. H.	130 East 22d St., New York City	1912
McLELLAN, E. A., M. D.	105 Park St., Bridgeport, Conn.	1916
McNAIR, J. C., M. D.	Fayette, Miss.	1916
McNALLY, THOMAS J., M. D.	22 Oxford St., Guelph, Ont.	1912
McNEIL, ARCHIBALD, M. D.	85 Rockledge Ave., White Plains, N. Y.	1914
*†McRAE, HENRY C.	3413 Piedmont Ave., Baltimore, Md.	1907
†McSHANE, JOHN J., M. D.	169 English Ct., Kenosha, Wis.	1915
McSWEENEY, EDW. F.	40 Central St., Boston, Mass.	1915
MAC DIARMID, JOHN.	2½ South Blvd., Deland, Fla.	1915
MACDONALD, MISS PEARL.	State College, Pa.	1915
MACKENZIE, PROF. C. J.	Care Univ. of Saskatchewan, Saskatoon, Sask.	1915
MACKNIGHT, ADAM S., M. D.	355 North Main St., Fall River, Mass.	1915
*†MACNUTT, J. SCOTT.	38 Westland Ave., Boston, Mass.	1910
MAHONEY, FRANCIS X., M. D.	701 Columbia Rd., Boston, Mass.	1912
MAHONEY, JOHN JOSEPH, M. D.	401 Lafayette St., Jamestown, N. Y.	1915
MALARET, PEDRO, M. D.	Box 66, Ponce, P. R.	1915
MALLALIEU, WILLARD C.	494 Bergen Ave., Jersey City, N. J.	1916
MALONEY, PAUL J., M. D.	Cornwall, Ont.	1912
MALONEY, J. B., M. D.	Key West, Fla.	1915
MANCHESTER, HIRAM L., M. D.	Pawlet, Vt.	1916
MANHEIMER, W. A., PH. D.	565 West 139th St., New York City	1914
MANN, FRANK H.	105 East 22d St., New York City	1915
**MANN, KRISTINE, A. M., M. D.	251 West 100th St., New York City	1915
MANNING, WM. J., M. D.	1113 N. St., North West, Washington, D. C.	1909
MARCLEY, WALTER J., M. D.	Walker, Minn.	1904
*MARCUSSEN, WM. H.	Nichols, N. Y.	1913
*†MARK, PROF. EDGAR N.	State Sanitary Engineer, Bowling Green, Ky.	1912
**MARK, MISS MARY LOUISE.	270 South State St., Westerville, Ohio	1915
||MARKS, MISS JEANETTE.	The President's House, South Hadley, Mass.	1914
MARSH, WM. HENRY, M. D.	P. O. Box 75, Solomons, Md.	1915
*MARSHALL, CHARLES E.	44 Sunset Ave., Amherst, Mass.	1901
MARTINEZ, EMILIO, M. D.	Neptune 56, Havana, Cuba	1911
MASLON, MORRIS, M. D.	3 Lincoln Ave., Glen Falls, N. Y.	1915
MASON, E. MARVIN, M. D.	1308-1314 Jefferson Co. Bank Bldg., Birmingham, Ala.	1913
*MASON, WILLIAM P.	Troy, N. Y.	1905
MATHER, SAMUEL.	Address unknown	
MATHERS, JOHN M.	103 East Pine St., Goldsboro, N. C.	1914
MATSON, E. G.	431 Sixth Ave., Pittsburgh, Pa.	1911
MATTHEWS, L. A.	66 North Willow St., Montclair, N. J.	1915
†MATTISON, FITCH C. E.	City Chamber of Commerce, Pasadena, Cal.	1910
MEAD, DANIEL W.	530 State St., Madison, Wis.	1892
*MEADER, FRED MARLIN, M. D.	State Health Dept., Albany, N. Y.	1912
MEADER, PERCY D.	Arnold Laboratory, Brown University, Providence, R. I.	1915
MEARS, E. N. K., M. D.	48 Brattle St., Cambridge, Mass.	1915
MEARS, J. EWING, M. D.	1535 Land Title Bldg., Philadelphia, Pa.	1905
Subscription to J. E. Mears Library Foundation, Trinity College, Hartford, Conn.		
†MEBUS, C. F.	908 Land Title Bldg., Philadelphia, Pa.	1912
MEEKER, ROYAL.	Bureau of Labor Statistics, Washington, D. C.	1911
†MELVIN, ALONZO D.	1751 Park Rd., Washington, D. C.	1910
MENDEZ, ARTURO, M. D.	San Luis Potosi, Mex.	1906

- MENGE, G. A. Bureau of Animal Industry, Washington, D. C. 1912
- ††| MERCUR, WILLIAM HENRY, M. D. 5th Ave. and St. James St., Pittsburgh, Pa. 1912
- MERRILL, THEODORE C., PH. B., M. D. 1744 Columbia Rd., Washington, D. C. 1916
- ‡ MESSER, RICHARD. 1110 Capitol St., Richmond, Va. 1911
- METROPOLITAN LIFE INSURANCE COMPANY. 1 Madison Ave., New York City 1915
- MICHIGAN STATE HEALTH BOARD, SECRETARY. Lansing, Mich. 1915
- * MICKLE, F. LEE. State Water Survey, Urbana, Ill. 1914
- | MILES, R. E. Hartman Bldg., Columbus, Ohio 1912
- | MILLER, L. A., M. D. 418 Colorado Ave., Colorado City, Colo. 1913
- * MILLER, EDGAR C. L., M. D. Care Med. Coll. of Virginia, Richmond, Va. 1908
- † MILLER, OLIVER J., M. D. Peoples Bank Bldg., Sanford, Fla. 1914
- MILLS, WM. WIRT. 249 Manor Rd., West New Brighton, N. Y. 1910
- MITCHEL, E. W. P. O. Box 376, Ancon, C. Z. 1915
- MITCHELL, HENRY, M. D. 421 Meadowbrook Rd., Wayne, Pa. 1886
- *† MITCHELL, JOHN P. Stanford University, Cal. 1909
- * MOAT, C. P. State Health Board, Burlington, Vt. 1903
- ** MOCK, HARRY E., M. D. 7409 Sheridan Rd., Chicago, Ill. 1915
- MOHLER, JOHN R. 1620 Hobart St., North West, Washington, D. C. 1914
- MOHR, CHARLES A., M. D. 252 St. Anthony St., Mobile, Ala. 1915
- MOLLOY, DANIEL M., M. D. Address unknown 1914
- † MOLLOY, WILLIAM J., M. D. 310 South Mulberry St., Muncie, Ind. 1913
- MONCRIEFF, JOHN T., M. D. 1250 Broad St., Columbus, Ga. 1913
- MONFORT, WILSON F. 506 North Vandeventer Ave., St. Louis, Mo. 1908
- *† § MONJARAS, JESUS E., M. D. Calle de Ezequiel, Montes No. 15, Mexico City, Mex. 1891
- MONTILLA, F. Ayuntamiento Bldg., San Juan, P. R. 1915
- MOUQUIN, LOUIS H. F. 273 West End Ave., New York City 1916
- MOOR, FREDERICK C. Telephone Bldg., Tallahassee, Fla. 1914
- MOORE, CARROLL A. Bellows Falls, Vt. 1904
- † MOORE, JOHN A., M. D. Main St. and Park Ave., Millerton, N. Y. 1914
- MOORE, MRS. PHILIP N. 3125 Lafayette Ave., St. Louis, Mo. 1915
- § MOORE, T. V., M. D. Lewisohn Bldg., Butte, Mont. 1915
- * MOORE, V. A., M. D. Veterinary College, Ithaca, N. Y. 1896
- | MOREE, E. A. 14 Prospect Dr., Yonkers, N. Y. 1914
- MOREY, GEORGE C., M. D. Remsen, N. Y. 1915
- MORGAN, H. G., M. D. Third Floor, City Hall, Indianapolis, Ind. 1913
- MORGAN, JOHN W., M. D. 85 South Penn St., Denver, Colo. 1913
- MORRIS, MISS AGNES New Court Bldg., New Orleans, La. 1916
- | MORRIS, S. POULTER. State Capitol, Denver, Colo. 1912
- MORSE, ROBERT B. 16 West Saratoga St., Baltimore, Md. 1915
- ‡ MORSE, COL. W. F. 90 West St., New York City 1912
- MOSSER, ELIZA M., M. D. Galen Hall, Brooklyn, N. Y. 1889
- † MOTT, WM. E. 842 Sheridan Ave., Pittsburgh, Pa. 1910
- MUDGE, COURTLAND S. 32 Mt. Vernon St., Providence, R. I. 1913
- * MULCAHEY, JOHN V. 17 Eastfield Ave., Trenton, N. J. 1907
- MULDOWNEY, MISS MARY M. 363 Quail St., Albany, N. Y. 1915
- MULFORD, H. K. 412 South 13th St., Philadelphia, Pa. 1896
- * MULL, EDGAR P. Care Allen Filter Co., Toledo, Ohio 1910
- MULLIN, R. H., M. D. Univ. of Nevada, Reno, Nev. 1911
- MULLOWNEY, JOHN J., M. D. State Health Board, Harrisburg, Pa. 1913
- MUNFORD, SAMUEL A., M. D. 317 College Ave., Ithaca, N. Y. 1915
- MURPHEY, EUGENE EDMUND, M. D. 452 Telfair St., Augusta, Ga. 1914

†MURPHY, ANTHONY M., M. D.	City Hall, La Crosse, Wis.	1910
MURPHY, IGNATIUS J.	Minn. Public Health Assn., St. Paul, Minn.	1914
MURPHY, JOHN M., M. D.	1956 Jackson Blvd., Chicago, Ill.	1914
*MURPHY, LYMAN C.	Address unknown	1913
MURRAY, JOSEPH I.	Crescent Creamery Co., Winnipeg, Man.	1915
†MURRAY, T. AIRD	186 King St., West, Toronto, Ont.	1915
MURRAY, PROF. T. J.	Agricultural Experiment Station, Blacksburg, Va.	1916
MUSGRAVE, WILLIAM E., M. D.	Philippine General Hospital, Manila, P. I.	1915
NAGLE, JOHN T., M. D.	2 East 127th St., New York City	1874
||NASBITT, CHAS. T., M. D.	415 South Front St., Wilmington, Del.	1913
NATIONAL ORGANIZATION FOR PUBLIC HEALTH NURSING	54 East 34th St., New York City	1913
NAULTY, CHARLES W., JR., M. D.	U. S. Quarantine, Perth Amboy, N. J.	1915
†§NEFF, JOSEPH S., M. D.	Narberth, Pa.	1897
§NEILL, MATHER H., M. D.	Hygienic Laboratory, Washington, D. C.	1915
||NELBACH, GEORGE J.	105 East 22d St., New York City	1912
NELSON, N. A.	Long Branch, N. J.	1915
NEVIN, MISS MARY	State Laboratory, Dept. of Health, Albany, N. Y.	1915
NEW JERSEY STATE HEALTH BOARD	Trenton, N. J.	1915
NEW ROCHELLE DEPT. OF HEALTH	New Rochelle, N. Y.	1915
*NEWELL, CLYDE R.	905 West Illinois St., Urbana, Ill.	1914
†NEWLANDS, JAMES A.	11 Laurel St., Hartford, Conn.	1907
NEWMAN, G. A., M. D.	Care Prison Hospital, Stillwater, Minn.	1899
NICHOLS, JOHN D.	7100 Clark Ave., Cleveland, Ohio	1914
NICHOLS, M. STARR	1015 University Ave., Madison, Wis.	1916
NICHOLS, NELSON E., M. D.	657 Congress St., Portland, Me.	1911
NICKERSON, J. F.	431 South Dearborn St., Chicago, Ill.	1912
†NICOL, NORMAN C.	17 Gramercy Park, New York City	1913
NISBET, VERNER, M. D.	Marietta, Pa.	1915
NOBLE, ROBT. E., MAJOR M. C.	U. S. Army, War Department, Washington, D. C.	1915
†||NOLAND, LLOYD, M. D.	1404 Brown Marx Bldg., Birmingham, Ala.	1913
*NOLTE, AUGUST G.	2253 Athlone Ave., St. Louis, Mo.	1914
†NORTH, CHARLES E., M. D.	30 Church St., New York City	1908
NORTON, ARTHUR C., M. D., H. O.	Middletown Springs, Vt.	1916
†NORTON, GEORGE H., M. D.	7 Municipal Bldg., Buffalo, N. Y.	1913
*NORTON, JOHN F., PH. D.	Mass. Inst. Tech., Boston, Mass.	1912
NOXON, G. H., M. D.	Main and Gracious Sts., Darien, Conn.	1916
†NUEBLING, EMIL L.	25 North 11th St., Reading, Pa.	1912
OAKMAN, CARL S., M. D.	22 Locust St., Detroit, Mich.	1914
OBER, GEO. EUGENE, M. D.	632 Kossuth St., Bridgeport, Conn.	1916
OBERT, B. H.	709 Asbury Ave., Asbury Park, N. J.	1914
O'BRIEN, HENRY R.	532 Packard St., Ann Arbor, Mich.	1914
OBST, MRS. MAUD MASON	Bureau of Chemistry, Washington, D. C.	1915
†||OGDEN, PROF. H. N.	614 University Ave., Ithaca, N. Y.	1912
OHAGE, JUSTUS, M. D.	5th and Cedar Sts., St. Paul, Minn.	1915
OHIO STATE BOARD OF HEALTH	Columbus, Ohio	1911
O'MALEY, J. M., M. D.	Pike and Main St., Covington, Ky.	1916
O'MARA, MISS ELLA ANNA	313 Abercorn St., Savannah, Ga.	1914
*O'NEILL, JOHN H.	936 Aribella St., New Orleans, La.	1914
†||ORENSTEIN, A. J., M. D.	P. O. Box 1056, Johannesburg, South Africa	1912

OSBORN, MISS ALICE C.	Address unknown	1915
OSBORN, STANLEY H., M. D.	61 Elmwood Ave., North Adams, Mass.	1914
||OSBORNE, FRANK J.	City Hall, Orange, N. J.	1913
OSTHEIMER, MAURICE, M. D.	2202 De Lancey Pl., Philadelphia, Pa.	1915
OTIS, EDWARD O., M. D.	381 Beacon St., Boston, Mass.	1894
OVERTON, FRANK, M. D.	Patchogue, N. Y.	1912
||OWEN, EDWARD B., M. D.	402 West Main St., Merrill, Wis.	1913
OWEN, WM. O., M. D.	2719 Ontario Rd., Washington, D. C.	1910
OWENS, ROBERT B.	Edmonton, Alta.	1908
PAGE, B. W., M. D.	Court House, Lumberton, N. C.	1915
PAGÉ, J. D., M. D.	P. O. Sans Bruit, Quebec, Que.	1915
*PAGE, CALVIN G., M. D.	128 Marlborough St., Boston, Mass.	1914
PAINE, LISTON, M. D.	Hygienic Laboratory, Washington, D. C.	1915
**PALMER, GEORGE T.	40 St. Nicholas Pl., New York City	1911
PARK, EMORY R., M. D.	State Capitol Bldg., Atlanta, Ga.	1914
†PARK, WILLIAM E., M. D.	1246 East State St., Rockford, Ill.	1912
*PARK, WILLIAM H., M. D.	315 West 76th St., New York City	1899
PARKER, HENRY F., M. D.	9 Village Ave., Rockville Centre, N. Y.	1915
*PARKER, FRANCIS LE JAU, M. D.	40 Broad St., Charleston, S. C.	1914
*PARKER, HORATIO N.	Technology Chambers, Irvington St., Boston, Mass.	1900
PARNALL, CHRISTOPHER G., M. D.	Municipal Bldg., Jackson, Mich.	1915
PARRAMORE, JAMES B., M. D.	341-342 St. James Bldg., Jacksonville, Fla.	1915
PARRY, ELEANOR, M. D.	749 Madison Ave., New York City	1901
PARSONS, PAYN B.	641 Washington St., New York City	1915
**PARSONS, ROBERT	215 West 23d St., New York City	1915
PASTENE, ALBERT A., M. D.	Box 32, Chester, Mont.	1916
PATCHIN, CHARLES V., M. D.	66 Elizabeth St., Dansville, N. Y.	1915
PATTEN, MISS JANE B.	Elm Brook, South Natick, Mass.	1914
PATTERSON, FRANCIS D., M. D.	2103 Locust St., Philadelphia, Pa.	1913
PAUL, GEORGE P., M. D.	187 St. Botolph St., Boston, Mass.	1915
†PAXTON, JAMES W.	327 Municipal Bldg., Washington, D. C.	1912
†PEARSE, M. LANGDON	5435 East End Bldg., Chicago, Ill.	1910
†PEASE, H. D., M. D.	39 West 38th St., New York City	1897
PEEBLES, A. R.	1600 Hillside Rd., Boulder, Colo.	1914
PENDLETON, MISS HELEN B.	City Hall, Savannah, Ga.	1914
*PERKINS, ROGER G., M. D.	R. F. D. 105 A, Wakefield, R. I.	1902
†PERROW, MOSBY G.	1100 Federal St., Lynchburg, Va.	1908
||§PERRY, ARTHUR R., M. D.	U. S. Dept. of Labor, Washington, D. C.	1913
PERRY, FRANK, M. D.	Main and Maple Sts., Norwood, Ohio	1916
PERRY, F. C., M. D.	210 Laura St., Jacksonville, Fla.	1914
PERRY, J. C., M. D.	U. S. P. H. Service, Ellis Island, N. Y.	1903
PETERS, ARTHUR O., M. D.	705 Reibold Bldg., Dayton, Ohio	1915
PETERS, WILLIAM H.	3169 Vine St., Cincinnati, Ohio	1913
§PETRIE, WILLIAM F.	1025 Ionia St., West, Lansing, Mich.	1914
*†PHELPS, EARLE B., M. D.	Hygienic Laboratory, U. S. P. H. Service, Washington, D. C.	1902
*PHILBRICK, BURTON G.	18 Ocean Ave., Salem, Mass.	1908
PHILIPPINE HEALTH SERVICE	Manila, P. I.	1915
†PHILLIPS, ASA EMORY	1458 Belmont St., Washington, D. C.	1912
PICKEL, OSCAR C.	Box 919-920, Antofagasta, Chili	1913
†PICKETT, WM. H.	City Health Office, Gainesville, Fla.	1914
PILANS, P. P., M. D.	City Health Officer, Orlando, Fla.	1914

PINCUS, SOL.	Hygienic Laboratory, Washington, D. C.	1916
†|| PLATT, PHILIP S.	105 East 22d St., New York City	1914
§PLEADWELL, FRANK L., M. D.	Navy Department, Washington, D. C.	1909
§PLECKER, WALTER A., M. D.	1110 Capitol St., Richmond, Va.	1914
*PLUMMER, CHARLES G., M. D.	465 East South Temple St., Salt Lake City, Utah	1915
†POLING, J. A., M. D.	Old Colony Bldg., Freeport, Ill.	1911
*POMEROY, C. T.	9 Nowell Rd., Melrose Highlands, Mass.	1911
POMEROY, J. L., M. D.	Hall of Records, Los Angeles, Cal.	1915
POOR, DANIEL W.	27 Ridge St., Orange, N. J.	1915
PORTER, F. B., M. D.	P. O. Box 1008, Fort Worth, Tex.	1912
PORTER, GEORGE D., M. D.	162 Crescent Rd., Toronto, Ont.	1915
*PORTER, JOHN L., M. D.	840 Panola St., New Orleans, La.	1902
PORTER, JOSEPH Y., M. D.	State Health Officer, Jacksonville, Fla.	1878
*§PORTER, JOSEPH Y., JR., M. D.	Key West, Fla.	1911
†PORTER, S. D., M. D.	Box 18, R. F. D. No. 2, Baton Rouge, La.	1911
PORVIN, EDWARD C., M. D.	301 East Fordham Rd., New York City	1914
POTTENGER, FRANCIS M., M. D.	Monrovia, Cal.	1911
POTTER, ALEXANDER.	50 Church St., New York City	1914
†POTTS, CLYDE.	30 Church St., New York City	1907
POUCHER, FRANK C.	1 Madison Ave., New York City	1913
POWELL, ROBERT C.	1301 North Charles St., Baltimore, Md.	1915
§POWELL, THOMAS, M. D.	415 Columbia Trust Bldg., 313 West 3d St., Los Angeles, Cal.	1909
POWERS, LUTHER MILTON, M. D.	1022 North Alvarado St., Los Angeles, Cal.	1913
*PRATT, GILBERT H.	Box 37, Jersey City, N. J.	1905
||PRENTISS, MRS. S. R.	31 Kenduskeag Ave., Bangor, Me.	1912
*†PRESCOTT, PROF. SAMUEL C.	585 Boylston St., Boston, Mass.	1902
**PREST, CHARLES S., M. D.	54 Third St., Waterford, N. Y.	1912
*||PRICE, GEORGE M., M. D.	31 Union Sq., New York City	1912
PRICE, WILLIAM H., M. D.	City Health Board, Detroit, Mich.	1913
PROCTOR, REDFIELD.	Proctor, Vt.	1914
†PROVOST, ANDREW J., JR.	39 West 38th St., New York City	1910
PRUCHA, MARTIN J.	Univ. of Illinois, Urbana, Ill.	1915
*PRUDDEN, T. MITCHELL, M. D.	160 West 59th St., New York City	1904
PRYER, ROY W.	Detroit Board of Health, Detroit, Mich.	1916
PURDY, C. H.	Aragon Hotel, Jacksonville, Fla.	1914
PUTNAM, MRS. WM. LOWELL.	49 Beacon St., Boston, Mass.	1915
QUIMBY, E. FREDERICK.	Gatun, C. Z.	1913
QUIMBY, ROBERT STANLEY, M. D.	361 School St., Watertown, Mass.	1916
†QUINN, MISS MARTHA P.	612 Fidelity Bldg., Philadelphia, Pa.	1912
QUESSY, A. H., M. D.	Fitchburg, Mass.	1915
*||RACE, JOSEPH.	Ottawa, Ont.	1912
*RAHN, PROF. OTTO.	1111 West Stoughton St., Urbana, Ill.	1914
*||RAMALEY, PROF. FRANCIS.	Univ. of Colorado, Boulder, Colo.	1913
**RAND, W. H., M. D.	1440 Clifton St., Washington, D. C.	1915
RANDOLPH, MISS AGNES D.	1110 Capitol St., Richmond, Va.	1914
RANH, SIDNEY J., D. D. S.	54 Harrison Bldg., Cincinnati, Ohio	1916
†RANKIN, WATSON S., M. D.	5 West Hargett St., Raleigh, N. C.	1909
§RAUNICK, JOHN M. J., M. D.	212 Hamilton St., Harrisburg, Pa.	1915
*RAVENEL, M. P., M. D.	Univ. of Missouri, Columbia, Mo.	1897
RAVER, CARL F., M. D.	503 Lawrence St., Ann Arbor, Mich.	1914

†RAWLINGS, I. D., M. D.	1430 Sherwin Ave., Rogers Park Sta., Chicago, Ill.	1909
†RAYCROFT, PROF. JOSEPH EDW.	Princeton University, Princeton, N. J.	1914
*RECTOR, FRANK L., M. D.	36 Forty-first St., Brooklyn, N. Y.	1909
REDMOND, FRANCIS J., M. D.	Fillmore, N. Y.	1915
REEDE, EDWARD H., M. D.	The Rochambeau, Washington, D. C.	1915
REGISTER, EDWARD C., M. D.	Charlotte, N. C.	1914
*REICHEL, JOHN, M. D.	Glenolden, Pa.	1907
†REID, HERBERT I.	505 North Webber St., Colorado Springs, Colo.	1913
REILLY, WALTER A., A. M., M. D.	172 Meadow St., Naugatuck, Conn.	1916
REINOEHL, JOHN KRAUSE	Address unknown	1913
RETTGER, PROF. LEO F.	Sheffield Scientific School, New Haven, Conn.	1915
*†REVELL, D. G.	Edmonton, Alta.	1907
*REX, CLARENCE P.	201 National Union Bldg., Toledo, Ohio	1912
RHAME, WM., M. D.	Wautagh Ave., Wautagh, N. Y.	1915
*†RHYNUS, C. P.	Hygienic Laboratory, Washington, D. C.	1914
†RICH, EDWARD D.	621 Oakland Bldg., Lansing, Mich.	1913
RICHARDS, EDGAR	60 Ayrault St., Newport, R. I.	1889
†RICHARDS, LOUIS J.	City Hall, Elizabeth, N. J.	1909
**RICHARDSON, MISS ANNA M.	140 Mountain Ave., Summit, N. J.	1915
*§RICHARDSON, MARK W., M. D.	23 Equitable Bldg., Boston, Mass.	1909
RICHMOND, W. D., A. B., A. M., M. D.	209-211 Empire Bldg., Knoxville, Tenn.	1914
*††RICKARDS, BURT R.	34 Poplar St., Melrose, Mass.	1901
†RITCHIE, JOHN, JR.	Mass. Inst. Tech., Boston, Mass.	1912
§RITCHIE, PROF. J. W.	54 Saratoga Ave., Yonkers, N. Y.	1914
RITTENHOUSE, ELMER E.	25 West 45th St., New York City	1915
RIVERO, FILIBERTO, M. D.	127 Reina St., Havana, Cuba	1915
RIVES, WILLIAM C., M. D.	1702 Rhode Island Ave., Washington, D. C.	1885
ROACH, WALTER W., M. D.	2905 Columbia Ave., Philadelphia, Pa.	1915
ROBERG, DAVID N., M. D., D. T. M.	1012 Selling Bldg., Portland, Ore.	1916
†ROBERTS, C. F., M. D.	250 West 72d St., New York City	1892
†ROBERTS, JAMES, M. D.	City Hall, Hamilton, Ont.	1907
ROBERTSON, JOHN DILL, M. D.	City Hall, Chicago, Ill.	1915
*ROBIN, ALBERT, M. D.	1202 Delaware Ave., Wilmington, Del.	1899
ROBINSON, DAÑA E., M. D.	Ellis Island, New York City	1916
*ROBINSON, GEORGE L.	39 East 28th St., New York City	1913
ROBINSON, JAMES ERNEST, M. D.	Temple State Bank Bldg., Temple, Tex.	1912
ROBISON, JOHN A., M. D.	30 North Michigan Blvd., Chicago, Ill.	1914
ROCHESTER HEALTH BUREAU	Rochester, N. Y.	1915
ROCKHILL, C. S., M. D.	909 Union Central Bldg., Cincinnati, Ohio	1914
ROCKWELL, ALVIN H., M. D.	510 South Burdick St., Kalamazoo, Mich.	1913
RODDY, JOHN A., M. D.	1604 Pine St., Philadelphia, Pa.	1914
*ROGERS, LORE A.	3735 Oliver St., Washington, D. C.	1913
ROSCOE, H. L.	Sweet Springs Creamery, 2d and Vermont Sts., Sedalia, Mo.	1915
ROSE, LORENZO O., M. D.	Parkersburg, W. Va.	1907
*ROSENAU, J. MILTON, M. D.	82 Stedman St., Brookline, Mass.	1909
ROSENBERGER, RANDLE C., M. D.	Jefferson Medical College, Philadelphia, Pa.	1915
ROSS, LUTHER S.	1308 Twenty-seventh St., Des Moines, Iowa	1915
ROSSER, HENRY N., M. D.	Court House, Birmingham, Ala.	1915
*ROUND, L. A.	Bureau of Chemistry, Washington, D. C.	1911
||ROUTZAHN, E. G.	130 East 22d St., New York City	1912
†ROYER, B. FRANKLIN, M. D.	331 Donaldson Apts., Harrisburg, Pa.	1907
RUBINOW, I. M., M. D., PH. D.	131 East 23d St., New York City	1916

*RUCKER, JAMES B., JR., M. D.	State Health Laboratories, Philadelphia, Pa.	1911
RUCKER, W.	U. S. P. H. and M. H. Service, Washington, D. C.	1910
†RUEDIGER, GUSTAV F., M. D.	General Delivery, La Salle, Ill.	1908
*RUEHLE, G. L.	N. Y. Agricultural Experiment Station, Geneva, N. Y.	1914
*RUHLAND, GEORGE C., M. D.	City Health Dept., Milwaukee, Wis.	1914
RUNCIE, W. H., M. D.	103 West Merrick Rd., Feufort, N. Y.	1915
**†|RUSH, PROF. J. E.	Carnegie Inst. Tech., Pittsburgh, Pa.	1914
RUTTAN, HENRY	City Hall, Winnipeg, Man.	1908
RYAN, JOHN N., M. D.	158 Lexington Ave., Passaic, N. J.	1915
RYLAND, C. T., M. D.	1022 Main St., Lexington, Mo.	1916
SABEY, WELTON B., M. D.	Ravena, N. Y.	1915
SADTLER, SAMUEL S.	210 South 13th St., Philadelphia, Pa.	1915
**SAFFORD, VICTOR, M. D.	U. S. Immigration Station, Boston, Mass.	1915
*SALMONDE, H. F., M. D.	West Parish Filters, Westfield, Mass.	1910
SAMPER, B., M. D.	P. O. Box 77, Bogota, Columbia, South America	1916
**|SANBORN, MORTON F.	30 Ten Eyck Ave., Albany, N. Y.	1914
†|SANDERS, W. H.	Capitol, Montgomery, Ala.	1912
*SANDMAN, E. A.	Relay, Md.	1912
SANGUINET, MISS JOSEPHINE	Address unknown	1914
‡SAPPINGTON, HARRY O., M. D.	Galveston, Tex.	1914
SAUTTER, ARTHUR, M. D.	220 State St., Albany, N. Y.	1915
†SAVILLE, CHARLES	Director of Sanitation, Dallas, Tex.	1913
*SAWIN, LUTHER ROBINSON, M. D.	Mt. Kisco, N. Y.	1904
SAWYER, F. L.	Queen City Dairy Co., Buffalo, N. Y.	1914
*SAWYER, W. A., M. D.	3123 T St., Sacramento, Cal.	1910
SAYLER, HARLEY L., M. D.	1019 East 6th St., Des Moines, Iowa	1913
SCHAEFER, A. C., M. D.	753 Michigan Ave., Buffalo, N. Y.	1912
SCHELLER, MISS HELEN M.	Little Rapids, Wis.	1916
SCHENK, P. S., M. D.	17 Raleigh Ave., Norfolk, Va.	1911
SCHLER, O. B.	3701 Vernon Ave., Baltimore, Md.	1914
SCHMID, HENRY E., M. D.	White Plains, N. Y.	1913
SGHMDT, SAMUEL M.	21 Chambers St., Boston, Mass.	1916
*SCHNEIDER, PROF. EDWARD C.	218 East Uintah St., Colorado Springs, Colo.	1913
*SCHNEIDER, FRANZ, JR.	130 East 22d St., New York City	1908
SCHOONOVER, WARREN, M. D.	115 East 59th St., New York City	1895
*SCHORER, EDWIN H., M. D.	1010 Rialto Bldg., Kansas City, Mo.	1907
*SCHROEDER, MAY C., M. D.	Research Laboratories, Foot of E. 16th St., New York City	1912
SCHUYLER, MISS LOUISE LEE	Highland Falls, N. Y.	1915
SCHWARTZ, EDWARD J., M. D.	93 East Main St., Salem, Ohio	1916
*SCHWARTZ, FREDERICK W.	439 Hamilton St., Albany, N. Y.	1914
*SCHWEITZER, ADA E., M. D.	1205 College Ave., Indianapolis, Ind.	1913
SCOTT, PROF. ERNEST, M. D.	715 North Park St., Columbus, Ohio	1912
SCUDDER, MISS KATE	620 Greenip St., Covington, Ky.	1915
*SCUDDER, N. C., M. D.	104 West Liberty St., Rome, N. Y.	1914
*SEABRIGHT, JOHN E.	Address unknown	1913
SEARS, F. W., M. D.	709 South Warren St., Syracuse, N. Y.	1914
SEAVEY, MINNIE A., M. D.	1021 Tenth St., Sacramento, Cal.	1914
*†|SEDGWICK, PROF. W. T.	491 Boylston St., Boston, Mass.	1902
*SEEMANN, W. H., M. D.	La. State Board of Health, New Orleans, La.	1913
**||SELBY, CLARENCE D., M. D.	412 Potter St., Toledo, Ohio	1914

SELIGMAN, ISAAC.....	1 William St., New York City	1915
*SELL, F. W., M. D.....	102 Irwin St., Rahway, N. J.	1907
SEYMOUR, MISS GERTRUDE.....	105 East 22d St., New York City	1915
SEYMOUR, MAURICE M., M. D.....	Regina, Sask.	1908
SHARP, MISS RUBY W.....	1303 Twenty-Four and One-Half St., Rock Island, Ill.	1914
†SHAW, G. H.....	Bureau Animal Industry, Dept. Agriculture, Washington, D. C.	1914
SHAW, HENRY L. K., M. D.....	361 State St., Albany, N. Y.	1914
SHEA, THOMAS B., M. D.....	74 Marlborough St., Boston, Mass.	1900
SHEEHAN, W. J., M. D.....	103 Westchester Ave., Port Chester, N. Y.	1915
SHERIDAN, GEORGE V.....	1675 Franklin Ave., Columbus, Ohio	1916
SHERMAN, PROF. HENRY C.....	Columbia University, New York City	1914
SHERMAN, WALTER J.....	613 Nashby Bldg., Toledo, Ohio	1904
*SHIELDS, WILLIAM S.....	1201 Hartford Bldg., Chicago, Ill.	1912
*SHIMER, WILLIAM, M. D.....	122 State House, Indianapolis, Ind.	1912
SHINKLE, A. CLIFFORD.....	115 East 4th St., Cincinnati, Ohio	1914
SHIPLEY, ALFRED E., M. D.....	111 Halsey St., Brooklyn, N. Y.	1915
SHOEMAKER, W. W.....	Buffalo, N. Y.	1915
*[SHORE, C. A., M. D.....	Holleman Bldg., Raleigh, N. C.	1909
SHOWALTER, R. W.....	Eli Lilly & Co., Indianapolis, Ind.	1916
SHUMAN, GEORGE H., M. D.....	618 North St. Clair St., Pittsburgh, Pa.	1914
SIEGMUND, HARRY B.....	1918 Wilkens Ave., Baltimore, Md.	1915
†SIMMONS, FREDERICK G.....	353 Farwell Ave., Milwaukee, Wis.	1914
*SIMMONS, RICHARD H., M. D.....	118 South 6th St., Shamokin, Pa.	1914
*SIMONS, GEORGE W., JR.....	1075 Boylston St., Boston, Mass.	1914
SIMPSON, A. U., M. D.....	508 Cobb Bldg., Seattle, Wash.	1916
SIMPSON, CHARLES G.....	100 Holyrood Ave., Lowell, Mass.	1915
†SIMPSON, R. M., M. D.....	702 Sterling Bank, Winnipeg, Man.	1906
SINCLAIR, MISS ALICE.....	261 William St., Belleville, Ont.	1915
SINGER, WILLIAM F.....	114 West 9th St., Pueblo, Colo.	1913
†SKINNER, JOHN F.....	31 Somerset St., Rochester, N. Y.	1915
SKOOG, PAUL LEONARD.....	944 South 2d St., Springfield, Ill.	1914
*SLACK, ALBERT J.....	Institute of Public Health, London, Ont.	1906
†SLACK, FRANCIS H., M. D.....	51 Lincoln St., Hyde Park, Mass.	1905
SLATAPER, FELICIAN J., M. D.....	Houston High School, Houston, Tex.	1915
*SLEE, ARTHUR M.....	Swiftwater, Pa.	1913
SLEMONS, CLYDE C., M. D.....	City Hall, Grand Rapids, Mich.	1915
SMEDLEY, ANDERSON L., M. D.....	N. W. Corner 3d and High Sts., Hamilton, Ohio	1914
SMERSH, F. M., M. D.....	Owatonna, Minn.	1899
†SMITH, CLARENCE E., D. V. S.....	City Health Commissioner, Greenville, S. C.	1914
*SMITH, CLAUDE A., M. D.....	City Hall, Atlanta, Ga.	1911
SMITH, CLYDE F.....	Islington, Mass.	1915
†SMITH, C. MASON, M. D.....	Prince Edward St., Fredericksburg, Va.	1913
SMITH, GARRET.....	95 Troup St., Rochester, N. Y.	1915.
SMITH, GEO.....	Health Officer, Manchester, Vt.	1916
SMITH, GEORGE H.....	Glenolden, Pa.	1911
SMITH, JOHN ARCHIBALD, M. D.....	41 Riverside Dr., Saranac Lake, N. Y.	1914
†SMITH, J. WALDO.....	Municipal Bldg., New York City	1913
SMITH, KARL W., M. D.....	Univ. of Wisconsin, Madison, Wis.	1912
†SMITH, R. MORTON, M. D.....	Riverpoint, R. I.	1911
SMITH, WILLIAM W., M. D.....	2111 Robinson Ave., Portsmouth, Ohio	1916
SMOOT, LLOYD D.....	Engineers Bldg., Main and Orange Sts., Jacksonville, Fla.	1914

SMOCK, PROF. JOHN C.	Hudson, N. Y.	1899
SMYTH, FRANCIS R., M. D.	Bismarck, N. D.	1912
SNOW, WILLIAM F., M. D.	105 West 40th St., New York City	1909
SOLIS-COHEN, MEYER, M. D.	4102 Girard Ave., Philadelphia, Pa.	1915
†SOPER, GEORGE A., M. D.	391 West End Ave., New York City	1900
SORKNESS, PAUL, M. D.	Edwards Bldg., Fargo, N. D.	1916
§SOUTH, DAVID S.	145 South Hanover St., Trenton, N. J.	1907
†SPALDING, HERMAN, M. D.	3117 South Park Ave., Chicago, Ill.	1900
SPAULDING, CHARLES H.	1401 South 4th St., Springfield, Ill.	1914
‡SPEAR, WALTER E.	250 West 54th St., New York City	1913
*SPERRY, JOEL A., 2d.	1004 West Oregon St., Urbana, Ill.	1914
SPINDEL, E. S., M. D.	Myers Bldg., Springfield, Ill.	1916
SPITZ, HERMAN, M. D.	308 Eve Bldg., Nashville, Tenn.	1915
SPRAGUE, JOHN TITCOMB, M. D.	514 Bay St., Stapleton, N. Y.	1915
SPRENGER, FRED. K.	Bronxville, N. Y.	1915
SPURR, JAMES HENRY	Experiment Station, Lawrence, Mass.	1915
STAGE, LOU E.	Bliss, N. Y.	1915
STAHR, CHARLES P., M. D.	City Hall, Lancaster, Pa.	1915
STEFFEN, CHARLES J.	459 Thirtieth Ave., Milwaukee, Wis.	1914
STEVENS, MISS NELLIE C.	725 South 3d St., Ocala, Fla.	1914
STEVENS, RICHARD	Hoboken, N. J.	1915
*STEVENSON, ALBERT F.	3915 Woodley Rd., Washington, D. C.	1913
‡STEVENSON, W. L.	6912 Ridge Ave., Philadelphia, Pa.	1912
STEVENTON, G. C., M. D.	City Hall, Youngstown, Ohio	1907
*STEWART, HENRY V.	11th and Bank Sts., Richmond, Va.	1914
STEWART, J. REVERDY	1515 You St., Washington, D. C.	1914
STEWART, PAUL M., M. D.	U. S. P. H. Service, Ellis Island, N. Y.	1916
STICKNEY, VICTOR H., M. D.	101 Sims St., Dickinson, N. D.	1915
STIDHAM, HARRISON	Wilkins Bldg., Washington, D. C.	1914
§STILES, PROF. CH. WARDELL	25th and E Sts., Washington, D. C.	1904
*STILES, GEORGE W., JR.	Tabor Opera House Bldg., Denver, Colo.	1909
STIMSON, ARTHUR M., M. D.	Hygienic Laboratory, Washington, D. C.	1914
*STINGILY, CLYDE R.	State Health Laboratory, Jackson, Miss.	1914
*†STOKES, WM. ROYAL, M. D.	Lab. State Health Dept., City Hall Annex No. 1, Baltimore, Md.	1899
*STONE, BINGHAM, M. D.	184 Church St., Burlington, Vt.	1900
†STONE, ELLEN A., M. D.	280 Waterman St., Providence, R. I.	1914
*STONE, MURRAY C., M. D.	523 Woodruff Bldg., Springfield, Mo.	1913
STONE, W. C., M. D.	Ellicott City, Md.	1915
STOREY, THOMAS A., M. D.	Coll. of the City of N. Y., New York City	1912
*STOVALL, WILLIAM D., M. D.	State Hygienic Laboratory, Madison, Wis.	1914
*STORY, ROBERT V.	1426 Carroll St., St. Louis, Mo.	1914
STOUMANN, KNUD	Prudential Insurance Co., Newark, N. J.	1915
*†STRAUS, PROF. AUBREY H., Dept. of Bacteriology, Med. Coll. of Virginia,	Richmond, Va.	1909
STRAUS, NATHAN	33 West 42d St., New York City	1903
STRAUS, CHARLES	141 Broadway, New York City	1914
‡STREETER, H. W.	3d and Kilgour Sts., Cincinnati, Ohio	1914
STUART, EDWARD	American Red Cross, American Consulate, Nish, Serbia	1914
†SUMMERS, B. E., M. D.	City Hall, Richmond, Va.	1914
†||SUMNER, GUILFORD H., M. D.	Capitol Bldg., Des Moines, Iowa	1913
SUPPLEE, GEORGE CORNESS, M. S. A.	407 College Ave., Ithaca, N. Y.	1915
SUTHERLAND, CHAS. H., M. D.	Janesville, Wis.	1915

*†§SWARTS, GARDNER T., M. D.	State House, Providence, R. I.	1894
SWARTS, GARDNER T., JR., C. E.	70 Waterman St., Providence, R. I.	1915
*SWEET, ALBERT W., PH. D.	Newport, R. I.	1913
SWINGLE, PROF. D. B.	702 South Grand Ave., Bozeman, Mont.	1915
SYLE, MISS JOSEPHINE L.	439 West 4th St., Lexington, Ky.	1915
SYLVESTER, IRA W.	Alexandria, La.	1903
SZWAJKART, ADAM.	3535 West Diversey Ave., Chicago, Ill.	1914
TALBERT, C. M.	Room 322, City Hall, 12th and Market Sts., St. Louis, Mo.	1916
†TALBOT, A. N.	1011 West California Ave., Urbana, Ill.	1913
||TALBOT, MISS MARION	Green Hall, Univ. of Chicago, Chicago, Ill.	1893
*TANNER, FRED W.	Bacteriological Dept., Univ. of Illinois, Urbana, Ill.	1914
TANNER, WALLACE J.	419 Second Ave., North, St. Petersburg, Fla.	1914
†TARBETT, RALPH E.	3d and Kilgour Sts., Cincinnati, Ohio	1914
TAYLOR, HENRY W.	100 State St., Albany, N. Y.	1915
TAYLOR, JOHN R., M. D.	22 Prospect Ave., Madison, Wis.	1915
TAYLOR, JOS. E., M. D.	Gainesville, Fla.	1913
||TAYLOR, PAUL T.	105 East 22d St., New York City	1913
TAYLOR, WILLIAM U.	P. O. Box 147, Moores, N. Y.	1915
*†TEDESCHKE, LEON G., M. D.	3596 Wilson Ave., Cincinnati, Ohio	1909
TEIMER, THEODOR, M. D.	184 Clifton Ave., Newark, N. J.	1915
TENNESSEE ANTI-TUBERCULOSIS ASSOCIATION.	323 Sixth Ave., North, Nashville, Tenn.	1914
*TENNEY, ELMER S., M. D.	1st Lieut. M. R. P., Fort Barry, Cal.	1913
TERRELL, ALAN G.	22d St. near Griffin Ave., Riverhead, N. Y.	1915
TERRILL, JAMES J., M. D.	610 North 7th St., Temple, Tex.	1915
††TERRY, C. E., M. D.	2601 St. Johns Ave., Jacksonville, Fla.	1910
TETRAULT, PHILIP A.	Purdue University, Lafayette, Ind.	1914
†TETREAU, THOMAS, M. D.	211 South 4th St., North Yakima, Wash.	1912
THABAULT, GEORGE, M. D.	132 Main St., Winooski, Vt.	1916
THERIAULT, EMERY J.	U. S. P. H. Service, Cincinnati, Ohio	1915
THOMAS, ARTHUR H.	Haverford, Pa.	1913
*THOMAS, JAMES B.	920 North Carrollton Ave., Baltimore, Md.	1907
THOMAS, PROF. STANLEY JUDSON	Care H. K. Mulford Co., Glenolden, Pa.	1915
THOMSON, ALEC NICOL, M. D.	De Kalb Ave. and Raymond St., New York City	1916
THOMSON, T. F., M. D.	City Health Board, Milwaukee, Wis.	1915
*†THOMSON, JOHN T.	86th and Bartram Ave., Philadelphia, Pa.	1911
THOMSON, W. F.	Perlstein Bldg., Beaumont, Tex.	1915
THOMPSON, O. P.	935 West 3d St., Waterloo, Iowa	1914
THRASH, ELMORE C.	428 Chandler Bldg., Atlanta, Ga.	1914
*TICE, WILLIAM G., B. Sc., Bureau Foods and Drugs, State Health Dept., Trenton, N. J.		1909
TIFFANY, JOHN L.	170 William St., New York City	1915
†TIGHE, J. L.	189 High St., Holyoke, Mass.	1910
*TILLEY, F. W., M. D.	1311 Twenty-first St., North West, Washington, D. C.	1912
TINKHAM, HENRY C., M. D.	46 North Winooski Ave., Burlington, Vt.	1914
†TINSMAN, JOSEPH A.	2145 Derry St., Harrisburg, Pa.	1913
TLUSTY, ANTHONY	202 Sixteenth Ave., West, Cedar Rapids, Iowa	1913
TOLLES, FRANK C.	265 South Columbus Ave., Mt. Vernon, N. Y.	1915
TOLMAN, MAYO.	State Health Board, State Capitol, Charleston, W. Va.	1915
TOMPKINS, GEO. N., M. D.	Croton-on-Hudson, N. Y.	1915
†TORRALBAS, FEDERICO, M. D.	36 Tejadello, Havana, Cuba	1912
TORRANCE, F., M. D.	General Canadian Bldg., Ottawa, Ont.	1913
†§TRASK, JOHN W., M. D.	3 B St., South East, Washington, D. C.	1909

TRAYNHAM, A. P., M. D.	1110 Capitol St., Richmond, Va.	1915
TREMBLEY, CHARLES C., M. D.	Saranac Lake, N. Y.	1915
TROST, COL. SAM. W.	12 West Canal St., Cincinnati, Ohio	1916
†§TUCKER, GEORGE E., M. D.	Box 580, Riverside, Cal.	1912
TUCKER, HENRY, M. D.	14 Elliott St., Brattleboro, Vt.	1907
TUCKER, WILLIAM C., M. D.	156 Fifth Ave., New York City	1914
*†TULLY, EDWARD J.	State Laboratory of Hygiene, Madison, Wis.	1913
TURMAN, ALEXANDER E., M. D.	17 West Grace St., Richmond, Va.	1909
†TURNER, CLAIR E.	Care Mass. Inst. Tech., Boston, Mass.	1915
TURSTEAD, HUGH.	604 Pillsbury Bldg., Minneapolis, Minn.	1914
**TUSKA, GUSTAVE R.	68 William St., New York City	1915
TUTTLE, T. D., M. D.	930 Henry Bldg., Seattle, Wash.	1915
TWOMBLY, ALEX. H.	55 Liberty St., New York City	1914
TVEDT, HALFDAN SAMUEL.	39 West 38th St., New York City	1915
UNDERHILL, ELIZ. C., M. D.	South Hadley, Mass.	1911
UNDERHILL, FRED T., M. D.	City Hall, Vancouver, B. C.	1915
UNDERWOOD, WM. LYMAN.	Belmont, Mass.	1902
UTLEY, HERBERT H., M. D.	Smithfield, N. C.	1914
||VAN BLARCOM, MISS C. C.	30 North Michigan Blvd., Chicago, Ill.	1913
VAN BLARCOM, DIXON.	1547 Jackson St., San Francisco, Cal.	1914
§VAN BUREN, GEORGE H.	2474 Ontario Rd., Washington, D. C.	1912
VAN BUSKIRK, L. H.	40 East Northwood Ave., Columbus, Ohio	1915
VAN CLEVE, EDWARD M.	412 Ninth Ave., New York City	1916
*VAN DENSEN, W. P.	3510 Architect Ave., North East, Minneapolis, Minn.	1914
VAN DEVREDE, MISS JANE.	801 Price St., Savannah, Ga.	1914
VAN DUSEN, EDMUND C.	Franklin St., Athens, N. Y.	1915
VAN DUSEN, JAMES WALLACE.	Major Medical Corps, care Surgeon General U. S. A., Washington, D. C.	1915
*VAN ES, LOUIS.	Agricultural College, Fargo, N. D.	1909
VAN HOOD, E.	Ocala, Fla.	1915
VAN INGEN, PHILIP, M. D.	125 East 71st St., New York City	1914
VAN KLEEK, MISS MARY.	130 East 22d St., New York City	1915
†VAUGHAN, HENRY F.	Detroit, Mich.	1914
§VAUGHAN, MILTON, M. D., A. B.	City Hall, Little Rock, Ark.	1915
*†VAUGHAN, VICTOR C., JR., M. D.	Kiesge Bldg., Detroit, Mich.	1909
VAN WAGENEN, BLEECKER.	443 Fourth Ave., New York City	1915
VAN WINKLE, HOWARD L., M. D.	N. Y. State Dept. Health Lab., Albany, N. Y.	1915
†VEILLER, LAWRENCE.	105 East 22d St., New York City	1910
VICTORS, ERNEST A.	133 Geary St., San Francisco, Cal.	1915
VINSON, WILLIE J., M. D.	111 East Tarpon Ave., Tarpon Springs, Fla.	1914
†VOGELSON, JOHN A.	710 City Hall, Philadelphia, Pa.	1910
VON WEDEL, HASSON.	Von Wedel Laboratories, Dobbs-Ferry-on-Hudson, N. Y.	1915
VOSBURY, W. DE WITT.	601 Market St., Camden, N. J.	1916
†§VOTEY, PROF. J. W.	Burlington, Vt.	1909
*WACHTER, LEONARD M.	192 Partridge St., Albany, N. Y.	1906
WADE, MISS ETHEL M.	State Health Board, Minneapolis, Minn.	1909
WADSWORTH, AUGUSTUS B., M. D.	278 Bates St., Albany, N. Y.	1914
WADSWORTH, D. U.	1121 South Main St., Tulsa, Okla.	1915
WAGENIALS, H. H.	Marine Hospital, 3d and Kilgour Sts., Cincinnati, Ohio	1914

†WAGNER, ADOLPH.....	Old Dominion Land Co., Newport News, Va.	1912
WAGNER, EDWARD L.....	124 Willet St., Jamaica, Long Island, N. Y.	1914
*WAITE, PROF. HERBERT H.....	2144 B St., Lincoln, Neb.	1913
*WAITE, WILLIS W., M. D.....	Box 63, El Paso, Tex.	1910
WAKEMAN, BERTIS R.....	Hornell, N. Y.	1915
WALCOTT, WILLIAM W., M. D.....	32 West Central St., Natick, Mass.	1915
WALDO, RICHARD H.....	55 West 44th St., New York City	1913
†WALKER, PROF. ELTON D.....	138 South Atherton St., State College, Pa.	1914
*WALKER, JOHN T. A.....	17 Battery Pl., New York City	1912
WALKER, WATSON FRANK.....	Sanitary Engineer, Detroit Board of Health, Detroit, Mich.	1915
†WALL, EDWARD E.....	5361 Berlin Ave., St. Louis, Mo.	1914
WALLACE, WILLIAM M.....	634 Berwick Ave., Detroit, Mich.	1915
WALSH, JAMES H., M. D.....	780 Plymouth Ave., Fall River, Mass.	1915
WALSH, THOMAS A.....	81 Buena Vista Ave., Yonkers, N. Y.	1914
WALSH, THOMAS P., M. D.....	569 Main St., Middletown, Conn.	1915
WALTON, JAMES S., M. D.....	136 Market St., Amsterdam, N. Y.	1915
WARREN, B. S., M. D.....	U. S. P. H. Service, Washington, D. C.	1912
WARREN, GEORGE L., M. D.....	77 Houston St., Newark, N. J.	1908
*WARREN, HOWARD B.....	965 Church St., Mobile, Ala.	1914
WARD, HERBERT C.....	379 Agnes Ave., Detroit, Mich.	1915
WARNER, C. B., M. D.....	Port Henry, N. Y.	1915
WARRINER, CARLOS E.....	City Hall, Fort William, Ont.	1914
†WATERMAN, PROF. EARLE L.....	619 Oakland Bldg., Lansing, Mich.	1914
**WATKINS, J. A., M. D.....	U. S. P. H. Service, Pittsburgh, Pa.	1915
WATSON, CARL H.....	Great Neck, Long Island, N. Y.	1916
WATSON, IRVING A., M. D.....	Board of Health, Concord, N. H.	1881
†WATT, HARRY F., M. D.....	Ocala, Fla.	1914
WAY, J. HOWEL.....	Waynesville, N. C.	1915
WAYSON, N. E., M. D.....	Hygienic Laboratory, U. S. P. H. Service, Washington, D. C.	1915
§WEBER, J. J.....	105 East 22d St., New York City	1915
†WEBSTER, GEORGE S.....	4900 Penn St., Philadelphia, Pa.	1912
††WEBSTER, HENRY E., M. D.....	309 Lyceum Bldg., Duluth, Minn.	1910
WEBSTER, RICHARD O.....	1625 Transportation Bldg., Chicago, Ill.	1916
WEINZIRL, PROF. JOHN.....	4144 Tenth Ave., North East, Seattle, Wash.	1906
*WEISS, JOHN M.....	3611 Broadway, New York City	1914
†WELCH, HARRY E., M. D.....	412 Stamburgh Bldg., Youngstown, Ohio	1909
WELD, IVAN C.....	1116 Connecticut Ave., Washington, D. C.	1914
WELDON, L. J.....	521 Metropolitan Bldg., Denver, Colo.	1913
††WELLS, CHESTER H.....	Montclair, N. J.	1907
††WELLS, WILLIAM F., M. D.....	Kiptopeke, Va.	1910
*WERNER, RAY C.....	State Health Board, Atlanta, Ga.	1911
*WESBROOK, FRANK M.....	198 Hastings St., West, Vancouver, B. C.	1897
*WEST, FRANCIS D.....	Grant Ave., Torresdale, Philadelphia, Pa.	1909
†WEST, WILLIAM J., M. D.....	1000 Grove Ave., Richmond, Va.	1909
WESTERN ELECTRIC CO.....	500 South Clinton St., Chicago, Ill.	1915
†WESTON & BROOKER, INC.....	Palmetto Bldg., Columbia, S. C.	1914
†WESTON, EDMUND B.....	P. O. Box 1316, Providence, R. I.	1911
*WESTON, ROBERT S.....	14 Beacon St., Boston, Mass.	1896
†WHALEN, CHARLES J., M. D.....	25 East Washington St., Chicago, Ill.	1910
†WHEELER, MRS. W. M.....	Women's Municipal League, 6 Marlboro St., Boston, Mass.	1911
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†WHINERY, SAMUEL.....	95 Liberty St., New York City	1912

*†WHIPPLE, PROF. GEORGE C.	6 Berkeley Pl., Cambridge, Mass.	1899
†WHIPPLE, MELVILLE C.	212 Pierce Hall, Cambridge, Mass.	1915
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†WHITE, JOSEPH H.	San. Engr. Bur. of Mines, Pittsburgh, Pa.	1913
WHITE, REV. J. O.	501 East 3d St., Cincinnati, Ohio	1916
WHITE, WILLIAM A.	14 Wall St., New York City	1888
WHITE, WILLIAM C.	Bedford and Wandless Sts., Pittsburgh, Pa.	1913
†WHITELAW, THOMAS H., M. D.	408 Third St., Edmonton, Alta.	1908
*†WHITTAKER, H. A.	State Health Laboratories, Minneapolis, Minn.	1907
WHITTET, RUFUS.	141 State House, Boston, Mass.	1915
*||WHITTIER, FRANK N., M. D.	161 Main St., Brunswick, Me.	1912
WHITIN, FREDERICK H.	27 East 22d St., New York, N. Y.	1915
||§WHITNEY, MISS JESSAMINE S.	Children's Bureau, Washington, D. C.	1907
WHYLE, WM., M. D.	500 Second St., Watertown, Wis.	1904
WIEDEMANN, H. E.	Chemical Bldg., St. Louis, Mo.	1916
WILBER, THOMAS R.	930 Henry Bldg., Seattle, Wash.	1916
§WILBUR, CRESSY L., M. D.	116 South Lake Ave., Albany, N. Y.	1907
WILBUR, RAY L., M. D.	Sacramento and Webster Sts., San Francisco, Cal.	1915
WILD, WILLIAM F., M. D.	State House, Lincoln, Neb.	1915
||WILE, IRA S., M. D.	230 West 97th St., New York City	1912
*WILEY, HARVEY W., M. D.	1120 Woodward Bldg., Washington, D. C.	1901
*§WILLCOX, WALTER F.	257 Goldwin Smith Hall, Ithaca, N. Y.	1909
*WILLIAMS, ANNA W., M. D.	Research Laboratory, Foot East 16th St., New York City	1904
*†§WILLIAMS, ENNION G., M. D.	R. F. D. 4, Richmond, Va.	1905
WILLIAMS, HOWARD J., M. D.	720 Spring St., Macon, Ga.	1914
WILLIAMS, HENRY T., M. D.	274 Alexander St., Rochester, N. Y.	1915
WILLIAMS, JESSE L., M. D.	415 St. James Bldg., Jacksonville, Fla.	1914
§WILLIAMS, LINSLEY R., M. D.	State Health Dept., Albany, N. Y.	1914
WILLIAMS, SHERMAN, M. D.	346 Metropolitan Bldg., Denver, Colo.	1913
WILLIAMSON, NORMAN E., M. D.	1818 Price St., Berkeley, Cal.	1915
WILLIS, ROYALL H., M. D.	205 Park Pl., Brooklyn, N. Y.	1915
WILLS, F. A.	Wills-Jones Milk Co., Philadelphia, Pa.	1913
WILSEY, W. J.	67 State St., Perth Amboy, N. J.	1914
WILSON, DUNNING S., M. D.	121 West Chestnut St., Louisville, Ky.	1913
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WILSON, JOHN S., M. D.	22 South Hamilton St., Poughkeepsie, N. Y.	1910
WILSON, PROF. MARGARET B.	Hunter College, 68th and Park Ave., New York City	1915
WILSON, ROBERT J., M. D.	549 Riverside Dr., New York City	1915
WILSON, WILLIAM H.	41 Broad St., New York City	1915
WINN, J. C., M. D.	North Titus St., Gilmer, Tex.	1916
§††*WINSLOW, PROF. C.-E. A.	Yale University, New Haven, Conn.	1902
WINSLOW, J. C.	State Pub. Health Labs., Univ. of North Dakota, Bismarck, N. D.	1914
WINSLOW, PAUL V., M. D.	Poughkeepsie, N. Y.	1913
WISCONSIN INDUSTRIAL COMMISSION	State Capitol, Madison, Wis.	1915
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§WOLF, JOHN G., M. D.	1145 Berkeley Ave., Pueblo, Colo.	1914
WOLFF, ARTHUR J., M. D.	320 Collins St., Hartford, Conn.	1915
WOMER, WM. ALEXANDER, M. D.	1112 South Mill St., New Castle, Pa.	1914
WOOD, ALFRED V.	1777 Gloucester St., Brunswick, Ga.	1910
WOOD, EDWARD J., M. D.	201 Chestnut St., Wilmington, N. C.	1915
WOOD, EDWARD M., M. D.	River Ave., Winnipeg, Man.	1913

‡WOOD, HAROLD B., M. D.	State Health Dept., Charleston, W. Va.	1909
‡WOODBIDGE, PROF. S. HOMER	Mass. Inst. Tech., Boston, Mass.	1895
WOODHULL, GEN. A. A.	Princeton, N. J.	1874
WOODS, C. S.	Methodist Episcopal Hospital, Indianapolis, Ind.	1915
‡WOODS, F. A., M. D.	238 Maple St., Holyoke, Mass.	1914
‡§WOODWARD, WILLIAM C., M. D.	1782 Lanier Pl., Washington, D. C.	1896
*WOODWORTH, ELIZABETH A., M. D.	3201 Clinton Ave., Minneapolis, Minn.	1911
WORTHINGTON, SAMUEL	79 Park Ave., Glen Ridge, N. J.	1914
‡WRIGHT, FRANK W., M. D.	10 City Hall, New Haven, Conn.	1889
WRIGHT, PROF. JASPER H.	Mechanics Institute, Rochester, N. Y.	1915
*WRIGHT, JOHN HENRY	39 West 38th St., New York City	1914
‡WRIGHT, J. W., M. D.	247 West 8th St., Erie, Pa.	1897
‡WRIGHTSON, JAMES T., M. D.	2 Walnut St., Newark, N. J.	1914
§WYMAN, S. W., M. D.	139 Centre St., New York City	1915
YOU Mans, MISS IVA CATHERINE	1404 Walnut St., Jacksonville, Fla.	1914
§YOUNG, ALBION J., M. D.	State House, Augusta, Me.	1913
YOUNG, ANNA R., M. D.	Presbyterian Hospital, 41 East 70th St., New York City	1912
**YOUNG, AUGUSTUS A., M. D., B. S.	22 East Miller St., Newark, N. Y.	1915
YOUNG, MRS. C. A.	604 Fifth Ave., Asbury, N. J.	1906
*‡YOUNG, CLIFFORD C.	State Water Supply, Lawrence, Kan.	1912
YOUNG, C. T.	Plant City, Fla.	1915
YOUNG, GEORGE B., M. D.	Norfolk, Va.	1910
ZETEK, JAMES	Box 245, Ancon, C. Z.	1915
ZIEGLER, CARL, M. D., B. S. G.	2362 Wheeler St., Cincinnati, Ohio	1916
‡ZIMMELE, GEORGE B.	3301 Mt. Vernon Ave., Milwaukee, Wis.	1914
ZIMMERMAN, SAMUEL A., M. D.	707 Euclid Ave., Valley City, N. D.	1915

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THE PLACE OF NUISANCES IN THE LAW.

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Mr. Feezer, a member of the bar, has been practicing health rather than law and through his association with the Massachusetts and New York State Departments of Health, is well qualified to interpret this difficult phase of the health problem. In this article he places nuisances in their proper position and explains the most effective methods with which to accomplish their abatement.

LONG ago Justice Blackstone, the great master of the Common Law, defined a nuisance as "that which worketh hurt, injury, or damage"—and it is so even today.

THE POLICE POWER.

The average reader knows that there is inherent in government a species of power known as the police power, that, while the rights of individual liberty and individual property are sacred in the eyes of the law and entitled to a high degree of protection, nevertheless, liberty ends where license begins and license does begin when one individual uses his liberty or his property in such a manner as to transgress the similar rights of other individuals. This principle and this power which we call the police power are given direct or indirect recognition in our constitutional framework of govern-

ment both in states and in the nation. But this power is older than our constitution, it is older than Magna Charta. To use an ancient legal expression, it comes down from the time when the memory of man runneth not to the contrary.

The Law of Nuisances is older than public health, and the police power by which the law deals with nuisances is older than the public health. Not only this, but they are broader than public health. The old law, being fond of maxims, expressed this relation between nuisances, the rights of individuals, and the police power in the maxim, "Sic utere tuo, ut alienum non lædas." Literally, "Use not that which is yours to the injury of another." Upon this maxim and upon his own profound learning concerning the subject of nuisances Justice Blackstone formulated the definition already stated.

VARIETIES OF NUISANCE.

Nuisances are of almost endless variety, they include many things affecting the public generally both as to health and as to other matters and they also include many things which worketh hurt, injury, or damage merely to an individual as well as those which affect the public interest.

It is possible to conceive of many private nuisances. The spite fence is often cited as an example. This example should not be used, however, without calling attention to the fact that it is not spite which makes it a nuisance. And it may be further stated at this point that a nuisance does not depend upon the motive of the person maintaining it or responsible for it. Another common example of a thing long held to be a private nuisance is the case of a house with eaves projecting over the land of another. A private nuisance, therefore, is an injury that results from a violation of private rights and produces a damage to but one or a few persons.

PUBLIC AND PRIVATE NUISANCES.

Public nuisances, on the other hand, are those which affect a considerable portion of the public by the violation of what is essentially a public right. Suppose that I have a tract of land and a stream flowing through that land is polluted by the superior riparian proprietor whose land immediately adjoins mine. This act constitutes a violation of my private right, as a landowner and riparian proprietor, to have that water come to me unimpaired in quality and quantity. It is, therefore, a private nuisance. If the

pollution or any other act of my neighbor is such that its effect is complete on my property it is nothing more than a private nuisance. On the other hand, suppose that the stream is so polluted that the foreign material is carried far down past the land of many proprietors. Suppose it is a stream which is used by the public for fishing, bathing, and as a source of public water supply. It then becomes a violation of the public right to have a pure stream and although it may constitute a private nuisance to me and to the other riparian owners, it is at the same time a public nuisance.

Nuisances have been called by Dr. Hermann M. Biggs, the New York State Commissioner of Health, "the bane of the average health officer's administration." They have been so much so that health authorities may sometimes be warranted in feeling that all nuisances are health questions. Fortunately they are not all of the sort that affect public health. The list of those which do or may affect public health, and which, by almost immemorial custom, it has fallen to the health officer to deal with, is long enough. There are those nuisances which *do* have a very direct bearing on the public health, a number of others which *may* affect the public health and still others, so long supposed to affect health, that for the present at least the health officer cannot hope to escape the onerous duties which they impose. Appended is a list of acts and things judicially determined to be nuisances, in which those calling most frequently for the health officer's attention are printed in italics.

THE GOVERNMENT AND NUISANCES.

The police power has already been referred to. It should be defined briefly as that power of state government which is for the protection of the health, morals, safety, and welfare of the public. In the United States where the federal government possesses only those powers which have been resigned to it by the states, this power is inherent in *state* government. The federal government exercises only such limited police power functions as are necessarily incidental to the execution of its specific constitutional authority. The local municipal authorities, including city councils, town boards and local boards of health, possess only such portions of this power as are delegated to them by state constitutions or legislative enactment.

The power to deal with nuisances affecting the public health is a portion of the police power and is exercised by health authorities by virtue of this delegation and subject to certain limitations incident to all delegated powers of government.

NUISANCE A QUESTION OF FACT.

The law affords a number of remedies which may be used in case there is a public nuisance. Some require the intervention of a court and others are administrative.

It may seem a paradox, but I would emphasize, that a remedy, provided by law for relief from a public nuisance, should never be resorted to unless there is a nuisance. The existence of a nuisance is not always an easy question, but must be determined

before any action is taken. Upon the certainty of this point depends the security of the health officer's position in case the molested owner seeks revenge. There are actions at law which the man with an alleged nuisance may use to the very great embarrassment of the health officer, if his action has been ill considered.

THE ESSENCE OF NUISANCE.

The gist of a public nuisance is, that the defendant is actually doing the act, or maintaining the thing, which is alleged to be a nuisance and that a right of the public or of a considerable number of persons thereby is being violated, or is in danger of being violated. If the health officer brings suit or takes summary action to abate a nuisance he may be required to prove that this state of facts exists. The motive or intent, as already stated, is not of the essence. It is immaterial whether the defendant's motive in maintaining a nuisance is malicious or not. On the other hand, negligence is no excuse. Also there is no prescriptive right to maintain a public nuisance, that is, the unmolested maintenance of a nuisance does not, by lapse of long years, create an inalienable right to continue doing so.

Some things are nuisances *per se* by virtue of a provision of statute. In such case it is sufficient to show that the thing mentioned in the statute does exist. Other things may or may not be nuisances, depending upon extraneous circumstances. In such case it is obviously necessary to show that the thing not only exists but that the circumstances exist which make it danger-

ous. Complaints of this class of things often come to the health officer, branded by the aggrieved person as a nuisance. A demand that something which annoys a neurasthenic old lady be abated immediately, if not sooner, is a not uncommon experience. All manner of things, remotely, if at all, related to health, are brought to health officials with a demand for immediate action. Some of them are not nuisances at all, others are purely private nuisances affecting only the complainant. Others, while perhaps of a public nature, cannot by the wildest flights of imagination be connected with the subject of health.

Refusal to act upon such a complaint, however trivial or without his jurisdiction, is likely to make for the health officer an enemy, unless he is able to deal with it very wisely and tactfully. The ability to recognize the class to which a nuisance belongs and to explain to the complainant the right method of procedure will be a valuable bit of equipment for any health officer to have and will often assist him in keeping the good will of a constituent. May I add a word of warning to this suggestion—Don't carry your enthusiasm to the point which will constitute practicing law without a license. Remember that the person who needs to avail himself of legal procedure for the enforcement of private rights should be referred to a lawyer and he who wishes to suppress a public nuisance not affecting the public health should be referred to the authorities charged with the prosecution of crime, generally the city solicitor or the district attorney.

The border line nuisances which do not at the time affect the public health but which constitute a menace to it, nevertheless are nuisances, and it is sufficient to establish the act and the inherent danger of the situation without showing that actual injury has taken place. Stagnant water may be of this class. Strangely enough, in dealing with this stagnant-water nuisance the imprint left upon the law by the old miasmatic theory serves our modern purpose now that we know these places to be the possible means of spreading mosquito-born diseases. Indeed many of the acts of this class are nuisances *per se* and it is sufficient proof of nuisance to show that they exist. This is the case with the exposure of persons infected with a contagious disease.

Some of the things which are held to be nuisances *per se* have been so regarded since very ancient times and without statutory enactment. The exposure of infected persons is of this class. More recently a number of other things have been added by statute. In dealing with this class of cases it is obviously necessary that the wording of the statute be carefully borne in mind in case it becomes necessary to take any action against them.

LEGAL REMEDIES FOR NUISANCES.

The principal remedies for nuisance are four in number. Indictment, Injunction, Suit for damages and Abatement. All of them may be used under proper circumstances for both public and private nuisance. The action for damages is very rarely if ever suitable for dealing with the public sort.

INDICTMENT.

In very ancient times there were primitive forms of procedure such as the *assize of nuisance*. Indictment is now generally regarded as the original form of action against a public nuisance. This means that a nuisance is a wrong to the state, a minor sort of crime, to be proceeded against as such. While it is little used at present owing to the development of other remedies, indictment must not be forgotten. It is still available and may often be very useful in dealing with some types of nuisance and with some types of defendants not easily or effectively reached by the other forms of procedure. Its principal disadvantage is its slowness. It may often take a considerable length of time to get an indictment and considerably more to secure a conviction under it. Indictment is not a preventive remedy but is a punishment for that which has been done and, as prevention is the object generally sought, other remedies are much more frequently resorted to.

SUIT FOR DAMAGES.

Suit for Damages is brought in the case of a public nuisance only where it also constitutes a private nuisance. In this case the person recovers on the basis of damage to his person or property. At first such damages were recoverable only where there was a technical trespass, that is, an invasion of the property or a direct injury to the person. In the application of this rule it was found that there were many wrongs that were obliged to go unrighted because they did not constitute a trespass. The indirect

injury, caused by the pollution of a stream already mentioned, did not constitute an invasion of the plaintiff's land by the defendant and there was consequently no relief unless the act also constituted an indictable public offense.

To meet situations of this sort, the law invented a new form of procedure known as the "action on the case." The indirectly injured person might bring this action and was enabled to recover such money damages as he was able to show himself entitled to. Actions for damage brought at the present time under either statute or modernized common law procedure are the outgrowth of either trespass or the action on the case.

Both the punishment remedy for public and the compensatory damage for private nuisances are "ex post facto" as it were; they do not prevent, even though an order for abatement may be allowed with the judgment for damages when it is shown to be just, and upon conviction under an indictment for nuisance it is very common for the court to issue an order for the abatement of the nuisance.

EQUITABLE REMEDIES.

Some hundreds of years ago, when the technicalities of the law were so unelastic as to refuse relief except the case came within the narrow prescribed outlines of a common form of action, and when the contemporary medicine was indeed a black art, the king was accustomed to dispense justice in cases where in conscience a wrong ought to be righted and there was no legal remedy. Later it fell to

the Chancellor, the keeper of the King's Conscience, to dispense justice and from this beginning developed the Courts of Chancery or Equity and finally the equitable jurisdiction now dispensed by all courts in most places. Equity soon devised remedies for the situations unrecognized by the law. The most prominent of equitable remedies is known as injunction. The basis of all equitable jurisdiction is the inadequacy of legal relief. It is obvious that this is the very situation in the case of a public nuisance. The public does not want damages in this sort of case and the extent of the damage would be incapable of adequate proof in most instances.

INJUNCTION.

Injunction is the remedy sought in most of the nuisance cases now brought into court. It is impossible in this paper to go into the technicality of injunction and the popular literature of recent years has given the public a general idea of the nature and effect of an injunction. We may therefore pass to the subject of abatement.

ABATEMENT.

The law encourages people to help themselves when troubled with a nuisance and permits individuals to abate private nuisances. The person so doing assumes the risk that he may go too far and become liable for trespass. Public authorities are given by

the statute a similar power. Health authorities in case of epidemic have very extensive powers to take summary action for the purpose of abating nuisances dangerous to the public health.

Except in cases of grave emergency, abatement must be preceded by a notice and generally by the opportunity for a hearing where the person responsible is given a chance to show cause why the thing complained of should not be interfered with.

The thing abated must be a nuisance at the time when it is abated. Abatement is a powerful remedy and correspondingly a dangerous one, both for the one who uses it and for the one against whom it is used. The action of health officers in such matters as this is always subject to the possibility of judicial review.

The health officer should exercise his power to deal with nuisances fearlessly for the public good, but he should also play safe and not subject himself to legal process as a result of carelessness.

In closing I would reiterate the following cautions: First of all be sure you have a nuisance existing; secondly, be sure it is a public nuisance; third, make sure it concerns public health, if not try and have it referred to the public prosecutor; fourth, never employ the method of abatement unless there is an immediate necessity and then only upon the advice of the public counsel for your municipality.

FOOT NOTE ON NOISOME SMELLS.

Noisome smells probably constitute the great bulk of the nuisances with which health officers are asked to deal. This is so, notwithstanding

the fact that such nuisances rarely have the slightest effect upon health. The old fiction of miasms and the sewer-gas bogey are gone, but

they have left to the health officer this legacy of trouble.

It is a useless expenditure of time and energy for the health officer to investigate and suppress this type of nuisance, but tradition has fastened the duty upon him and it must be faced. The increasingly recognized relation of insects, especially flies, to the spread of disease is giving this type of nuisance a renewed importance. The noisome smell complained of may, after all, arise from an accumulation of filth which constitutes a fly breeding place. It is therefore important for the health officer to know something about this class of nuisances. This note cannot go into detail but it should be stated that a noisome smell may be a nuisance independently of its unwholesomeness or danger to health. It is sufficient that such a smell be annoying or offensive to the person of ordinary

sensibilities. In other words, a smell so annoying to other persons as to interfere with the public comfort may constitute a nuisance. The distinction between public and private nuisance must be carefully observed in dealing with smells. They are very frequently purely a private nuisance.

Offensive smells sometimes raise the question whether or not statutory provisions giving health authorities certain powers and duties in connection with nuisance compels them to act in such cases. The attorney general of New York in an opinion dated August 10, 1900, without argument makes the following broad statement:

"Sir: I have the honor to acknowledge the receipt of your letter of the 6th instant and in reply will say, that the word '*Nuisance*' as used in the Health Law, relates to such nuisances as are detrimental to health, and to none other."

PARTIAL LIST OF THINGS HELD TO BE NUISANCES.

29 Cyc 1165.

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|---|--|
| 1. <i>Advertisements</i> | 29. <i>Cesspools</i> |
| 2. <i>Bakeries</i> | 30. <i>Coal yards</i> |
| 3. <i>Ball games</i> | 31. <i>Coke ovens</i> |
| 4. <i>Banking</i> | 32. <i>Collection of surface water</i> |
| 5. <i>Barking of dogs</i> | 33. <i>Contagious diseases</i> |
| 6. <i>Barns</i> | 34. <i>Convict labor</i> |
| 7. <i>Bawdy houses</i> | 35. <i>Cooking</i> |
| 8. <i>Beer</i> | 36. <i>Dairies</i> |
| 9. <i>Bells</i> | 37. <i>Dams</i> |
| 10. <i>Billiard rooms</i> | 38. <i>Dangerous animals</i> |
| 11. <i>Bituminous coal</i> | 39. <i>Dangerous structures</i> |
| 12. <i>Blacksmith shop</i> | 40. <i>Discharge of sewage or refuse</i> |
| 13. <i>Blast furnace</i> | 41. <i>Diversion of water</i> |
| 14. <i>Blasting</i> | 42. <i>Dyeing establishments</i> |
| 15. <i>Boiling and rendering places</i> | 43. <i>Effigies</i> |
| 16. <i>Booms (logs)</i> | 44. <i>Electric light plants</i> |
| 17. <i>Bowling alleys</i> | 45. <i>Excavations</i> |
| 18. <i>Breweries</i> | 46. <i>Explosives</i> |
| 19. <i>Brickmaking</i> | 47. <i>Factories</i> |
| 20. <i>Bridges</i> | 48. <i>Fair</i> |
| 21. <i>Car barns</i> | 49. <i>Falling of ice</i> |
| 22. <i>Carcasses of dead animals</i> | 50. <i>Fences</i> |
| 23. <i>Carpet cleaning</i> | 51. <i>Fertilizer factories</i> |
| 24. <i>Carriage making</i> | 52. <i>Fire engines</i> |
| 25. <i>Cattle pens</i> | 53. <i>Fire works</i> |
| 26. <i>Cellar doors on sidewalks</i> | 54. <i>Foundries</i> |
| 27. <i>Cement works</i> | 55. <i>Gambling houses</i> |
| 28. <i>Cemeteries</i> | 56. <i>Garbage plants</i> |

57. Gun works
58. Gipsy camps
59. Gold heating
60. Hitching posts
61. *Hospitals*
62. Jails
63. *Laundries*
64. *Livery stables*
65. Machinery
66. Marble works
67. Markets
68. Merry-go-rounds
69. Mills
70. *Moving picture places*
71. Obscenity
72. Obstruction of ways
73. Obstruction of waters
74. Oil wells
75. Oil works
76. *Overflow of water*
77. Overhanging structures
78. Placards

79. *Pollution of water*
80. *Ponds*
81. Pool selling
82. Prize fights
83. Public dances
84. Pumping stations
85. Purprestures
86. Railroads
87. *Saloons*
88. *Sewers*
89. Signs
90. Slaughter houses
91. Smelting works
92. Stud horses
93. Tallow factories
94. Undertaking establishments
95. *Waterclosets and privies*
96. *Wells*
97. Wharves
98. Whistles
99. Wrecks

The titles *underlined* are those most likely to affect public health.



HEALTH INSURANCE—ITS RELATION TO THE PUBLIC HEALTH.

Twenty-five out of every 1,000 employees in American industries, according to recent statistics, are constantly incapacitated by sickness, the average worker losing approximately nine days each year on this account. This "non-effective rate" for the great army of industrial workers in the United States barely suggests the total money loss to employers and employees. The lessened efficiency, the effects of reduced earnings in times of sickness, as well as the cost of medical attention, and the economic loss from deaths, swell the cost to industry and to the Nation to almost incalculable figures.

That much of this loss is nothing less than preventable waste and that this waste can be largely reduced by a properly conducted system of governmental health insurance for wage workers are conclusions set forth in Public Health Bulletin No. 76, containing the results of a study of "Health Insurance—Its Relation to the Public Health," just issued by the United States Public Health Service.

The preventive value of health insurance is given especial emphasis in this study. "Any system of health insurance for the United States or any state should at its inception have prevention of sickness as one of its fundamental purposes," says the bulletin. "This country should profit by the experience of European countries where prevention is being recognized as the central idea necessary to health insurance if health insurance is to attain its greatest success in improving the health and efficiency of the industrial population."

Such a system, it is pointed out in the bulletin, would

1. Provide cash benefits and medical service for all wage-earners in times of sickness at much less cost than is now possible. Adequate medical relief would thus be placed within the reach of even the lowest paid workers who are most subject to ill-health.

2. Distribute the cost among employers, employees, and the public as the groups responsible for disease causing conditions and afford these groups a definite financial incentive for removing these conditions. This can be done by means of small weekly payments from employees, supplemented by proportionate contributions from employers and government at a rate reducible in proportion to the reduction of sickness.

3. Become an effective health measure by linking the coöperative efforts of the three responsible groups with the work of national, state and local health agencies, and by utilizing these agencies in the administration of the health insurance system.

4. Afford a better basis for the coöperation of the medical profession with public health agencies.

5. Eliminate the elements of paternalism and charity-giving by making employees and the public, as well as employers, joint agents in the control of this fund.

"A governmental system of health insurance," concludes the study, "can be adapted to American conditions, and when adapted will prove to be a health measure of extraordinary value."

OCCUPATIONAL MORTALITY EXPERIENCE OF 94,269 INDUSTRIAL WORKERS.

METROPOLITAN LIFE INSURANCE COMPANY EXPERIENCE, 1911-13.

A Preliminary Report Read before the Section on Vital Statistics, American Public Health Association,
Rochester, N. Y., September, 1915.

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IT IS the purpose of this paper to present the preliminary results of an analysis of 94,269 death records of occupied white males, ages 15 and over, with especial reference to the influence of occupation upon the causes of death. The material is from the Industrial Mortality Experience of the Metropolitan Life Insurance Company and covers the three years 1911, 1912, and 1913. The occupations represented in this experience are almost entirely industrial in character. Table I shows that "laborers" form the largest group of decedents, with 11.4 per cent. of the total. All the more important occupations in the various industries are represented. There are large numbers of clerical employees, farmers, and farm laborers, workers in the building trades, in the iron and steel mills, and in the railway service.

A few words as to method may be of interest. The occupations returned upon the death certificates were classified according to a list of titles abridged and modified from the one prepared by the Census Bureau for use in occupational mortality tabulations. Attention was espe-

cially directed to those occupations which were represented in large numbers or which possessed exceptional interest from the viewpoint of hazard. The causes of death selected for the study were likewise those which were of the greatest interest because of their numerical importance or because they indicated the character of the hazard in the occupation. The number of deaths from these causes was then tabulated for each occupation by 10-year age periods. Table II presents the general characteristics of the material for all occupied white males combined. The remaining table (III, Parts a-n), is for individual occupations.

It were well if in addition to these tabulations there were available corresponding figures for the living policyholders by occupation and age. We would then have been able to present the death-rates occurring in the various occupations by age period and by causes of death. Unfortunately, this is not possible because of the great cost involved in keeping records in such detail for over ten million industrial policyholders. We may, nevertheless, determine the significant

TABLE I.

OCCUPATIONS OF WHITE MALE DECEDENTS—AGES 15 AND OVER.
METROPOLITAN LIFE INSURANCE COMPANY—INDUSTRIAL DEPARTMENT.
MORTALITY EXPERIENCE, 1911-13.

Occupation.	No. of Deaths.	Per Cent. of Total.
All Occupations (excluding "Retired").....	94,269	100.0
Laborers (undefined).....	10,748	11.4
Teamsters, Drivers and Chauffeurs.....	6,471	6.9
Clerks, Bookkeepers and Office Assistants.....	4,139	4.4
Carpenters.....	3,917	4.2
Farmers and Farm Laborers.....	3,890	4.1
Machinists.....	3,152	3.3
Painters, Paper-hangers and Varnishers.....	2,722	2.9
Policemen, Watchmen and Guards.....	2,407	2.6
Store Clerks and Salesmen.....	2,396	2.5
Textile Mill Workers.....	2,390	2.5
Merchants and Storekeepers.....	2,260	2.4
Saloon-keepers and Bartenders.....	2,190	2.3
Railway Track and Yard Workers.....	1,932	2.0
Janitors and Building Employees.....	1,770	1.9
Masons and Bricklayers.....	1,748	1.9
Iron Moulders.....	1,646	1.7
Coal Miners.....	1,557	1.7
Shoemakers.....	1,452	1.5
Stationary Engineers and Firemen.....	1,443	1.5
Children, Students and Scholars.....	1,437	1.5
Blacksmiths.....	1,273	1.4
Professional Service.....	1,186	1.3
Agents and Canvassers.....	1,183	1.3
Plumbers, Gas Fitters and Steam Fitters.....	1,153	1.2
Tailors and Garment Workers.....	1,095	1.2
Compositors and Printers.....	1,056	1.1
Railway Enginemen and Trainmen.....	947	1.0
Street Railway Employees.....	868	.9
Hostlers and Stablemen.....	832	.9
Hucksters and Peddlers.....	829	.9
Sailors and Marine Workers.....	787	.8
Iron and Steel Mill Workers.....	762	.8
Waiters.....	758	.8
Cabinet and Furniture Makers.....	757	.8
Cigar Makers and Tobacco Workers.....	693	.7
Leather Goods Workers.....	662	.7
Bakers.....	654	.7
Longshoremen and Stevedores.....	651	.7
Tinners and Tinware Workers.....	614	.7
Street and Sewer Cleaners.....	609	.6
Electricians.....	596	.6
Barbers.....	582	.6
Coopers.....	521	.6
All Other Occupations.....	15,534	16.5

TABLE II.

NUMBER OF DEATHS FROM PRINCIPAL CAUSES AND PER CENT. EACH CAUSE OF ALL CAUSES IN ALL OCCUPATIONS (EXCLUDING "RETIRED")—BY AGE PERIODS OVER FIFTEEN YEARS—WHITE MALES.
METROPOLITAN LIFE INSURANCE COMPANY—INDUSTRIAL DEPARTMENT—MORTALITY EXPERIENCE, 1911-1913.

Cause of Death.	Inter-national List No.	Ages 15 and over.		Ages 15-24.		Ages 25-34.		Ages 35-44.		Ages 45-54.		Ages 55-64.		Ages 65 and over.		Av. Age at Death.
		No. of Dths.	*Per cent.	No. of Dths.	Per cent.	No. of Dths.	Per cent.	No. of Dths.	Per cent.	No. of Dths.	Per cent.	No. of Dths.	Per cent.	No. of Dths.	Per cent.	
All causes	.....	94,269	100.0	11,116	100.0	12,953	100.0	15,242	100.0	16,696	100.0	19,135	100.0	19,137	100.0	47.9
Typhoid fever	1	1,390	1.5	581	5.2	356	2.7	211	1.4	128	.8	81	.4	33	.2	31.1
Influenza	10	769	.8	64	.6	65	.5	94	.6	113	.7	189	1.0	244	1.3	53.3
Tuberculosis of the lungs	28, 29	19,349	20.5	3,753	33.8	5,292	40.9	5,017	32.9	3,084	18.5	1,640	8.6	563	2.9	37.1
Cancer (all forms)	39-45	4,378	4.9	76	.7	103	.8	357	2.3	989	5.9	1,665	8.7	1,388	7.3	57.8
Acute articular rheumatism	47	380	.4	105	.9	46	.4	52	.3	75	.4	51	.3	51	.3	41.1
Chronic rheumatism and gout	48	69	.1	4	.....	6	.....	6	.....	10	.1	20	.1	23	.1	54.9
Diabetes	50	913	1.0	110	1.0	92	.7	100	.7	171	1.0	249	1.3	191	1.0	49.7
Alcoholism	56	889	.9	21	.2	182	1.4	314	2.1	227	1.4	106	.6	39	.2	43.1
Chronic lead poisoning	57	81	.1	3	.....	8	.1	24	.2	24	.1	14	.1	8	.....	47.5
Other occupational and chronic poisonings	58, 59	31	.....	4	.....	4	.....	7	.....	7	.....	4	.....	5	.....	45.8
Cerebral hemorrhage, apoplexy and paralysis	64, 66	5,825	6.2	52	.5	100	1.2	350	2.3	864	5.2	1,845	9.6	2,554	13.4	60.9
Organic diseases of the heart	79	11,323	12.0	640	5.8	697	5.4	1,181	7.7	1,850	11.1	3,048	15.9	3,907	20.4	55.6
Acute and chronic bronchitis	89-90	804	.9	30	.3	36	.3	52	.3	103	.6	213	1.1	370	1.9	59.9
Pneumonia (lobar and undefined)	92	6,776	7.2	539	5.4	982	7.3	1,228	8.1	1,369	8.2	1,431	7.5	1,197	6.3	48.1
Pleurisy	93	276	.3	46	.4	30	.2	40	.3	59	.4	55	.3	46	.2	46.1
Cirrhosis of the liver	113	2,136	2.3	22	.2	154	1.2	389	2.6	635	3.8	593	3.1	343	1.8	52.0
Bright's disease	120	9,059	9.6	276	2.5	577	4.5	1,190	7.8	1,851	11.1	2,553	13.3	2,612	13.7	55.1
Suicide (all forms)	155-163	2,150	2.3	308	2.8	402	3.1	436	2.9	428	2.6	383	2.0	193	1.0	43.1
Accidental violence	{ 165-181 185-186 }	8,752	9.3	2,130	19.2	1,616	12.5	1,516	9.9	1,419	8.5	1,236	6.5	835	4.4	39.3
All other causes of death	.....	18,719	19.9	2,292	20.6	2,175	16.8	2,678	17.5	3,290	19.7	3,759	19.6	4,525	23.9	.....

* Percentage, deaths from specified causes, of deaths from all causes in age period.

TABLE III.

NUMBER OF DEATHS FROM PRINCIPAL CAUSES AND PER CENT. EACH CAUSE OF ALL CAUSES, IN FOURTEEN OCCUPATIONS
BY AGE PERIOD OVER FIFTEEN YEARS—WHITE MALES.
METROPOLITAN LIFE INSURANCE COMPANY—INDUSTRIAL DEPARTMENT—MORTALITY EXPERIENCE, 1911-1913.

Part	Occupation.	Cause of Death.	Age Period.										Average Age at Death.
			15 and over.		25-34.	35-44.	45-54.	55-64.	65 and over.				
			No. of Deaths.	*Per cent.	Per cent.	Per cent.	Per cent.	Per cent.					
a	Blacksmiths	All causes..... Tuberculosis of the lungs.....	1,273 178	†(1,273) 14.0	(47) 100.0 29.8	(87) 100.0 28.7	(165) 100.0 35.8	(235) 100.0 17.0	(337) 100.0 8.3	(402) 100.0 3.0	55.4 43.9		
b	Cigar Makers and Tobacco Workers	All causes..... Tuberculosis of the lungs..... Suicide (all forms).....	693 167 22	(693) 24.1 3.2	(66) 100.0 48.5 3.0	(98) 100.0 44.9 2.0	(95) 100.0 41.1 4.2	(121) 100.0 25.6 3.3	(158) 100.0 11.4 3.8	(155) 100.0 2.6	49.5 37.9 49.3		
c	Clerks, Bookkeepers and Office Assistants	All causes..... Tuberculosis of the lungs.....	4,139 1,449	(4,139) 35.0	(1,307) 100.0 46.3	(893) 100.0 51.2	(695) 100.0 33.4	(518) 100.0 21.6	(431) 100.0 8.8	(295) 100.0 1.7	36.5 29.4		
d	Coal Miners	All causes..... Tuberculosis of the lungs..... Acute and chronic bronchitis..... Pneumonia (lobar and undefined)..... Suicide (all forms)..... Accidental violence.....	1,557 91 49 161 18 317	(1,557) 5.8 3.1 10.3 1.2 20.3	(151) 100.0 4.0 4.6 7.4 62.9	(135) 100.0 11.9 2.2 43.7	(182) 100.0 12.1 1.1 10.4 2.2 30.7	(319) 100.0 6.6 1.6 14.7 2.2 15.7	(407) 100.0 3.4 4.2 11.3 7.7 10.3	(363) 100.0 3.3 6.9 8.8 4.1	51.3 45.8 63.6 53.1 44.6 36.6		
e	Compositors and Printers.....	All causes..... Tuberculosis of the lungs.....	1,056 360	(1,056) 34.1	(217) 100.0 45.2	(221) 100.0 49.8	(225) 100.0 39.1	(176) 100.0 23.9	(120) 100.0 15.8	(97) 100.0 3.1	40.2 33.5		
f	Farmers and Farm Laborers...	All causes..... Organic diseases of the heart.....	3,890 641	(3,890) 16.5	(239) 100.0 5.9	(198) 100.0 3.5	(266) 100.0 6.8	(431) 100.0 13.7	(1,008) 100.0 18.5	(1,748) 100.0 20.4	58.5 63.6		
g	Laborers	All causes..... Suicide (all forms).....	10,748 186	(10,748) 1.7	(622) 100.0 4.8	(1,026) 100.0 2.9	(1,453) 100.0 2.1	(2,049) 100.0 1.5	(2,732) 100.0 1.7	(2,866) 100.0 .7	52.8 44.9		
h	Machinists	All causes..... Suicide (all forms).....	3,152 81	(3,152) 2.6	(573) 100.0 1.6	(565) 100.0 3.5	(500) 100.0 3.2	(509) 100.0 3.3	(516) 100.0 1.4	(489) 100.0 2.5	43.9 43.8		

i	Painters, Paperhangers and Var- nishers	All causes, Chronic lead poisoning	2,722 54	(2,722) 100.0 2.0	(166) 100.0 .6	(388) 100.0 1.1	(552) 100.0 3.4	(502) 100.0 2.5	(502) 100.0 1.9	(452) 100.0 .9	48.6 47.7
j	Railway Enginemen and Train- men	All causes, Tuberculosis of the lungs, Organic diseases of the heart, Suicide (all forms), Accidental violence,	947 133 51 23 401	†(947) 100.0 14.0 5.4 2.4 42.4	(203) 100.0 11.8 1.0 2.5 66.5	(300) 100.0 14.7 1.3 2.3 57.7	(173) 100.0 24.9 5.2 2.9 30.0	(109) 100.0 13.8 10.1 2.8 18.3	(94) 100.0 7.4 13.8 2.1 17.1	(68) 100.0 17.6 1.5 7.4	37.4 34.8 52.2 36.7 30.1
k	Railway, Track and Yard Workers	All causes, Accidental violence,	1,932 402	(1,932) 100.0 20.8	(177) 100.0 43.5	(243) 100.0 34.6	(232) 100.0 32.3	(334) 100.0 19.5	(475) 100.0 13.0	(471) 100.0 8.3	50.7 41.4
l	Saloon-Keepers and Bartenders	All causes, Alcoholism, Cirrhosis of the liver, Bright's disease, Suicide (all forms),	2,190 75 165 267 60	(2,190) 100.0 3.4 7.5 12.2 2.7	(57) 100.0 3.5 .. . 3.5 3.5	(492) 100.0 4.7 4.5 6.3 3.9	(775) 100.0 4.5 8.3 10.7 2.3	(535) 100.0 2.2 10.7 17.4 1.9	(243) 100.0 1.2 6.6 18.1 3.7	(88) 100.0 .. . 6.8 15.9 2.3	42.6 38.8 44.4 46.8 41.2
m	Teamsters, Drivers and Chauff- eurs	All causes, Tuberculosis of the lungs,	6,471 1,825	(6,471) 100.0 28.2	(768) 100.0 36.6	(1,498) 100.0 42.7	(1,579) 100.0 35.7	(1,152) 100.0 20.2	(818) 100.0 10.0	(656) 100.0 4.0	42.2 35.5
n	Textile Mill Workers	All causes, Suicide (all forms),	2,390 43	(2,390) 100.0 1.8	(383) 100.0 2.3	(282) 100.0 1.4	(310) 100.0 1.0	(399) 100.0 3.5	(495) 100.0 1.4	(521) 100.0 1.2	47.6 45.4

* Per cent. deaths from specified causes, of deaths from all causes in age period.

† Superposed figures denote total deaths, all causes, in specified age period.

facts in the relation between occupations and causes of death by the method of proportionate mortality, that is, by comparing the per cent. of total deaths from any one cause in a given age period and in a specified occupation with the corresponding figure for all occupied persons. For example, at the age period 25 to 34, 28.7 per cent. of the deaths among blacksmiths were due to tuberculosis of the lungs (see Table III, a*). For the same age period, the corresponding proportion of deaths from tuberculosis of the lungs among all occupied males was 40.9 per cent (Table II). The ratio of these two percentages may be conveniently called the index of mortality for the specified cause. In this instance the index of mortality for tuberculosis of the lungs among blacksmiths in the age period 25 to 34 is 70.2 per cent. It is quite evident, therefore, that pulmonary tuberculosis among blacksmiths at the age period 25 to 34 does not require the same relative attention from hygienists as it does in certain other occupations.

The fuller paper will take up in this manner each of the occupations and consider the causes of death which present the greatest variations from the standard of "all occupations." In this paper we shall refer only to a few of the more interesting considerations which arise out of the study. Thus we find that pulmonary tuberculosis was the most represented cause of death in ten out of the fourteen occupations referred to in these tables. It was found most common among

clerks, bookkeepers, and office assistants (Table III, c) where it was responsible for 35 per cent. of all the deaths. In the age period 25 to 34, 51.2 per cent. of all the deaths were from this disease, whereas, among all occupied males in this age period, only 40.9 per cent. of the deaths were from pulmonary tuberculosis. The index of tuberculosis mortality among clerks, bookkeepers, and office assistants is, therefore, 125, the index for this disease was also found high among compositors and printers (Table III, e) and among teamsters, drivers, and chauffeurs (Table III, m). It was found least represented among coal miners (Table III, d), where it was responsible for only 5.8 per cent. of all the deaths. In the age period 25 to 34 we find only 11.9 per cent. of all the deaths due to this disease. The index of tuberculosis mortality, therefore, is 29 per cent. This low index is characteristic of the disease among coal miners at all age periods up to 65. It might appear that the low proportionate mortality from pulmonary tuberculosis among coal miners is the result of the high proportion of deaths from other causes, notably accidental violence. Yet other respiratory diseases such as pneumonia and acute and chronic bronchitis are even more prevalent among coal miners than among all occupied males. A fairly large proportion of tuberculosis is found among railway employees, who suffer from a higher proportion of accidents than do the coal miners. A high percentage from accidents is, therefore, not incompatible with a fairly normal proportionate mortality from pulmonary tuberculosis. Coal miners seem to

*Owing to limitations of space, it has been considered inadvisable to print the tables for individual occupations in full; only those causes of death are given to which reference is made in the text.

enjoy a very definite immunity from pulmonary tuberculosis. Future medical research, in determining just what the protective factor in the environment of the coal miner is, will make an advance that will be of great practical value.

Organic disease of the heart ranks next in importance in our investigation. It is responsible for 12 per cent. of all deaths in all age periods combined. Unlike tuberculosis, which is most prevalent at the younger ages, this disease reaches its highest point in the advanced age periods, namely, 65 and over, where 20.4 per cent. of all deaths are due to it. It is also the leading cause of death in the age period 55 to 64. It is found most prevalent among farmers and farm laborers (Table III, f), among whom it was responsible for one death out of every six. This is not an indication of poor health conditions among farmers, however, for farmers live to a ripe old age, and organic disease of the heart is, as we have shown, primarily a disease of the older ages. This disease is found least represented among railway enginemen and trainmen. Inferences must not be drawn too readily from the relative proportion of heart disease in various occupations, since it is one of the more unsatisfactory returns of cause of death found on certificates, obscuring in many instances more definite conditions which autopsy could determine.

Alcoholism is one of the minor causes of death in our tabulation; yet it is so significant socially that reference will be made to it. It was responsible for only .9 per cent. of all the deaths among all occupied males. This fig-

ure is clearly an understatement, because deaths which are due to alcoholism are often assigned to its major effects. Thus we find that those occupations which are most subject to alcoholism show also a higher rate from Bright's disease and cirrhosis of the liver. Alcoholism is found most prevalent among saloon-keepers and bartenders (Table III, l). Among them it was responsible for 3.4 per cent. of the total deaths. In the age period 25 to 34, it caused 4.7 per cent. of all deaths and, in the age period 35 to 44, 4.5 per cent. If we add to this the proportionate mortality from cirrhosis of the liver and Bright's disease we obtain 23.5 per cent. of all the deaths. Among all occupied males, on the other hand, these three diseases in the age period 35 to 44 are responsible for only 12.5 per cent. of all the deaths. The unfavorable effect of occupation is, therefore, quite clear in the case of saloon-keepers.

A strong positive correlation, in all probability, exists between the incidence of alcoholism and that of suicide. This latter cause was responsible in our investigation for 2.3 per cent. of all the deaths at all ages (Table II). The proportion varies somewhat in the various age periods, but is greatest at ages 25 to 34. It is most prevalent among cigar makers (Table III, b), saloon-keepers and bartenders (Table III, l), machinists (Table III, h) and railway enginemen and trainmen (Table III, j); in other words, among occupations where the wear and tear on the nervous system is greatest. Its importance as a cause of death is least noted among coal miners (Table III, d), laborers (Table III, g) and textile mill

workers (Table III, n). Recent investigators have urged that suicide is a form of insanity. On this basis, it would appear that the high incidence of suicide among saloon-keepers and bartenders may be in part the result of the insanity induced by alcoholism. This opens up a fertile field of investigation for both the statistician and the psychiatrist.

Accidental violence is found to be most prevalent among enginemen and trainmen (Table III, j), coal miners (Table III, d) and railway, track, and yard workers (Table III, k). It is most highly represented at the younger ages in all these occupations. Thus, among railway enginemen and trainmen, the index of mortality for accidental violence in the age period 25 to 34 is 461.6; in the age period 55 to 64 this index is reduced to 263.1. These indices, when compared with similar figures for European mortality experiences, show how inadequate American methods of accident prevention still are.

Occupational diseases are represented in small numbers. Lead poisoning is found significant among painters, paper hangers, and varnishers (Table III, i). In this occupational group 2 per cent. of all the deaths occurring were due to chronic lead poisoning, and in the age period 35 to 44 this proportion rose to 3.4 per cent. Other occupational diseases are so rarely recorded as not to warrant any special mention.

In this preliminary statement I have been able to review only a few of the more important causes of death, as represented in a small number of

occupations. Sufficient has been said, however, to show that this method of investigation is a profitable one for furthering industrial hygiene. I would therefore suggest that health officers of states and cities take note of the recommendations made last year by the Committee on Occupational Mortality of this Section on Vital Statistics, American Public Health Association, and that they attempt to analyze and report their mortality returns by occupation, cause of death, and age period. Local communities often have certain hazardous occupations largely developed in their midst, and enjoy splendid opportunities for the intensive investigation of the effects of occupation upon the life and health of the worker. They can, at small expense, determine the number of workers in any particular industry, their age, their occupational environment, the character of the illnesses which are treated by the local physicians, the evidence of physical deterioration during service, and finally the mortality as shown by the death certificates which they receive. Such local reports prepared over a series of years would extend the findings of the Census Bureau and of life insurance companies, and would often have enormously important practical results in improving the hygienic conditions of the industry studied. It is also hoped that this Section will again take active steps in urging the Federal Government to bring to a successful conclusion the investigation of occupational mortality begun by the Census Bureau in connection with the returns for the year 1910.

THE EXPERIENCE OF NEW YORK CITY IN GRADING MARKET MILK.

LUCIUS P. BROWN,

*Director Food and Drugs Bureau of the Department of Health of
New York City.*

Read before a General Session of the American Public Health Association, Rochester, N. Y.,
September 7, 1915.

In a remarkably clear and lucid style, Mr. Brown states the manner in which the largest city in the country has dealt with the problem of controlling its milk supply. While the essentials of the system are few, their execution is a big task. Read what Mr. Brown has to say about it.

I. IN a city of large size it is impossible to so safeguard a milk supply confined to raw milk only, at any reasonable cost, as to insure its absolute safety.

II. The present system of milk control in New York City has justified itself by the absence of any considerable milk-borne epidemic of typhoid or other disease within the past two years, and by the ease with which any epidemic appearing can be now traced and controlled.

III. The New York system of milk control is necessarily a growth of many years, and is a development proceeding *pari passu* with the growth of knowledge in preventive medicine and particularly of knowledge of the principles of pasteurization.

IV. The essential features of New York City's milk control system are:

(a) Pasteurization of all milk except that intended for special uses.

(b) In connection therewith bacteriologic standards properly administered.

(c) The labelling of all packages intended to go to the consumer.

(d) Constant inspection and supervision of the pasteurizing plants, which is an inspection that it is physically and economically possible to make efficient, in direct contrast with the attempt to handle an enormously large number of dairies and their employees, a thing which can be done efficiently only at prohibitive cost.

To thoroughly understand the situation in New York City a short statement of the problem is desirable.

This problem is as follows: The control, both chemical and sanitary, of a milk supply for a city of about five million people, with the aim not only of avoiding raising the cost of the milk, but, if possible, of actually extending its use as a cheap and easily digested food. Analysis of the milk supply shows that about two and one-quarter million quarts of milk (not including cream and condensed milk) are consumed daily in the city,* furnished by seven states and by two provinces in

* The equivalent of an additional two and three-quarter million quarts is represented by cream and condensed milk. The requirements for cream are same as for milk, except that the bacteria count is allowed to be five times higher.

the Dominion of Canada. It is estimated that about 50,000 dairies, about 440,000 cows and about 300,000 people are employed. This milk supply is handled in 60 city and 436 country pasteurizing plants and there are 700 shipping stations for milk shipped raw to the city pasteurizing plants. The longest haul upon milk coming to New York is about 460 miles, and 80 per cent. of it over 200 miles.

The machinery at hand for controlling the milk supply is of course that under the control of the City Board of Health. Under the Constitution of New York State, and charter of New York City, the ordinances of this Board have the effect of laws; its powers are absolute and very broad, being limited only by the disposition of the city's financial boards to appropriate the funds necessary for the enforcement of the laws made by the Board of Health.

Following is a statement of the chief successive steps taken for the control of New York City's milk supply which have led up to the system now in effect. The first step taken was in 1873, when "swill" milk was forbidden. In 1876 a code section was passed by the Board of Health forbidding watered milk. In this control, however, only the well known lactometer of the New York City Board of Health was used. The producers finally learned how to beat this lactometer and in 1895 chemical standards were set up.

In 1897 a permit system was inaugurated for wagons and milk stores. In 1900 the cooling of milk in transit was begun and there has been pro-

gressive improvement in this particular feature since that time. In 1902 one milk inspector was sent to the country to examine the sources of supply. In 1904 the milk inspection work, which was formerly done by the separate boroughs, was centralized in the hands of the City Board of Health and a regulation was made that all milk must be kept, while in process of shipment or sale, at a temperature not greater than 50 degrees Fahrenheit. In 1905 a systematic inspection of creameries was begun and certain deficient ones were forced out of business. In 1906 the two inspectors then at work began the inspection of the dairy farms proper, and sixteen new inspectors were added. Rules and regulations for the guidance of dairymen were made; and these appear to have been very well received by the dealer, because of the help it gave him in regulating his own business. In 1907 a beginning of the exclusion system was made; the requirements being that weekly reports be made by creamerymen and dairymen of contagious diseases occurring in their establishments, and they were required to cease handling their milk on occurrence of any such diseases. Failure to comply with this regulation meant the exclusion of their milk from the city. This principle was afterwards applied to other conditions. Milk stores were likewise regulated as to sanitary condition, and the score card system was adopted. A notable occurrence during this year was the appointment of the McClellan Commission of Physicians, in the report of which it was recommended that 100 country and forty

city inspectors be appointed. It will be noted that up to this time all the regulations were designed toward the securing of a satisfactory raw milk supply. In 1908 the first notice in an official way of pasteurization was made. This regulated pasteurization, which had to be conducted under permit. During the same year the exclusion system was extended to unsanitary conditions at the creameries and dairies, and the wagon permits were made conditional on satisfactory report of conditions of production and distribution. Likewise in this year the classification of milk appears to have been first made. It was graded into selected, inspected, guaranteed and certified, all conditioned on inspection by medical societies or in accord with regulations of the Board of Health, taking cognizance of conditions of the cows, bacterial count, time of delivery, etc. Pasteurized milk was allowed to be sold under permit; and there were supplementary regulations on pasteurization passed. The most notable occurrence of this year was the requirement that there should be attached to the container which reached the consumer or from which the consumer, in the case of loose milk, was served, a tag indicating the location of the dairy or creamery and the date of shipment. In 1909 pasteurized milk was defined and it was provided that the tags above mentioned must be kept for two months.

It will be noted that still up to this time little notice had been taken of pasteurization. But in 1910 a Board resolution (not having the direct effect of law) was passed, advising the

public that all milk for drinking should be either boiled or pasteurized, and a tentative plan for grading was made based on the broad division of

- (a) Milk for infants to drink.
- (b) Milk for adults to drink.
- (c) Milk for cooking only

These still form the broad general basis for grading.

In 1911 announcement was made that after January 1, 1912, all milk except special high grade milk was to be pasteurized. The warning of this contemplated action was given so far ahead because of the necessity of making changes in the plants of milk dealers.

At the end of 1911 there was a conference, participated in by dealers, the New York Milk Committee, the officials of the department and certain physicians, which assumed that in addition to pasteurized milk two grades of raw milk, one for children and one for adults, could be sold, based on prescribed tests for tuberculosis in cows. These rules went into effect in 1912, and are indicated on table herewith. This step was enabled by the advance of knowledge as to pasteurization, and, as will be seen, by recognition of the impossibility of properly inspecting a raw milk supply of this size. It was in no sense a backward step. In the year 1913, from the outbreak of a very bad milk-borne typhoid epidemic (1,100 cases in all), there resulted the abolition of Grade B raw milk, the pasteurization of all milk of this grade and the establishment of bacteriologic standards throughout. There resulted likewise the simplifying of Grade A

and the inclusion of cream in the pasteurization requirements.

This summary gives some indication of the weary road traversed by those men to whom is due the credit for the present excellent supply of milk for New York City. It will be noted that the essential features are pasteurization almost exclusively, and bacteriologic control of the raw and pasteurized milk, except in Grade A. It will be noted from table 2 that dairy scores are still used to assist in controlling the farms. This in no sense allows of the pasteurization of dirty milk. As a matter of fact, as is well known to those having to do with milk control, dirty dairies with their concomitant of careless and dirty methods almost invariably produce dirty milk, while on the other hand the clean dairy produces clean milk. Because of this human factor, a fair control of the condition of Grade B dairies may be effected through the bacteriologic examination of the milk. Grade A, which is naturally that milk requiring more supervision, is of course designed for the use of children, and must be, therefore, absolutely above suspicion. By requiring that no milk of a lower grade than A be handled in a Grade A plant, the necessary distinction as to that grade is readily secured. Mr. Russell Sturgis, formerly Chief of the Milk Division of the Bureau of Food and Drugs of the Health Department of New York City, in an excellent paper published in 1915, on "The Rôle of Dairy Inspection in Safeguarding a City's Milk Supply," and to which I am indebted for a very large part of what I have been saying, suggests that possibly at some future

time, when the private inspection systems of the milk companies have been more completely developed, it will be found that the score card standard, at present neglected, will be appreciated as a measure of value. As a matter of actual fact all companies handling milk desire of course to furnish Grade A milk, selling for the highest price. They therefore pay the farmer a premium for clean dairies and clean milk and this operates as incentive to the producer to improve his conditions.

It has often been objected to pasteurization, in the language of certain gentlemen of florid imagination, that the sale of pasteurized milk containing dead organisms—a sort of bacteria soup—is strictly parallel to the sale of a milk soup made from oysters of an uncertain vintage. I think experience hardly sustains this violent assumption! Whether it be true or not, however, the impossibility of handling a very large milk supply, such as that for the city of New York, without prohibitive cost for inspection as well as without raising the cost of raw milk to the consumer to a prohibitive figure, can be readily appreciated. Moreover, a raw milk supply of this size which is absolutely safe is a matter of practical impossibility under present conditions, if for no other reason, because of the absolute impossibility of keeping out, in the enormous number of people through whose hands the milk supply goes before reaching the consumer, carrier cases of typhoid, diphtheria, and the like.

In addition to the occasional farm inspection by the Department, farm inspection is promoted on the part of the companies by the necessary cor-

rection of conditions indicated by our inspections and counts, by the efforts of small companies trying to remedy faults, and by dairymen who are trying for the premiums for high dairy scores given by the companies. It may be further added that, prior to 1912 and the inception of this system of milk control, one or more typhoid outbreaks every year in New York City, which could be directly fastened on the milk supply, were the rule, and usually these were of very considerable size.

In 1914 and 1915 there has, up to date, been only one small milk-borne epidemic of typhoid, promptly stopped by shutting off the milk-supply, and only ninety direct cases in all. This occurred in a pasteurized supply, and appears to have been due either to a carrier case handling the milk after pasteurization, or, much more probably, to the water-supply of the creamery becoming suddenly polluted.

A short description of the methods used by the Department may be of interest. It is required that the pasteurization be conducted between 142 degrees Fahrenheit and 145 degrees Fahrenheit for not less than 30 minutes, and of course cooling after pasteurization must be very prompt. In making his inspection the inspector of course carefully examines all pipes and connections from pumps and other apparatus, taking everything apart if necessary to assure himself of cleanliness. He watches the sterilizing of the pipes and vats before use. In the actual handling of the milk he notes its condition as to dirt upon receipt and watches to see that it is not exposed to dust. If the automatic

temperature recorder is used, its accuracy is tested at each inspection. These recording devices indicate the holding period very well except in case of continuous retarders, and in this type of apparatus the holding period is best ascertained by watching the speed at which the milk is pumped through. It is cooled, preferably to 45 degrees or lower, and then the milk is immediately bottled or canned for shipment. By taking the temperature of cooling at frequent intervals, the inspector is able to advise whether the hot milk is fed to the cooler too fast to obtain good results. Special stress is laid on the cleanliness of bottles and cans used for holding pasteurized milk. For this a sterile water control is used in the bacteriologic examination, and inspectors are kept closely informed of all results, their personal effort being of great value in this connection. Water samples for this purpose are transmitted to the laboratory for a count in the same way as the milk samples, 50 cc. of sterile water being used for washing each can or bottle. The accepted standard is for bottles, 1,000 total bacteria in each 50 cc. so treated, and 40,000 for cans.

Schedules for inspection are so arranged that samples of milk are taken during inspection of pasteurizing plants at certain intervals. I quote from Sturgis' paper previously mentioned, as follows:

"Four samples are taken at each of the various steps, and from these four individual samples an average is obtained which fairly reflects the quality of the milk and also serves as a check upon the thoroughness of pasteurization. Usually these samples

are taken from (a) the raw milk (b) at the outlet of the holder or after the milk has been heated and held (c) from the outlet of the cooler (d) from bottles or cans that have been filled for shipment. These samples are thoroughly chilled, packed in ice, and shipped in the milk car to the city terminal, where they are collected upon arrival and taken to the laboratory."

Our present inspection force consists of twenty-one country inspectors and twelve city inspectors. The country inspector's duty consists in the inspection of plants as just mentioned, and of dairies. Grade A dairies are inspected three times a year and as much oftener as possible. Other dairies are inspected when the occasion allows. All inspections of dairies and creameries are recorded on score-cards of the New York city form, the dairy cards being made in duplicate and a copy left at the farm. The pasteurizing plants are not scored, but are recorded on a special card where only changes from the last inspection are noted. This is also in duplicate but the copy is sent to the office, and from there sent to the company responsible instead of being left direct with the company. On occasion, the epidemiology of suspected milk-borne diseases is investigated by these country men.

The city inspectors watch the supply to the point of delivery, that is to say, either to the retail store or to the customer if no store enters. The stores themselves are inspected by inspectors of the Food Division of the Bureau of Food and Drugs, avoiding in this way duplication of work. Of the twelve city milk inspectors attached

to the Division of Milk Inspection, three are on bacteria samples, five on samples for chemical analysis, two on pasteurizing plants alone, and two on the large city dairies and on the pasteurizing plants in outlying portions of the city. It is interesting to note here that within the city of New York itself there are over 100 dairies, with about 5,000 cows. Each of the bacteria squad takes sixty-eight samples daily of raw milk going to pasteurizing plants or of the pasteurized milk as offered for sale, making, all told (including forty samples each for the two men on the pasteurizing plants), 284 samples of milk taken in the city for bacterial examination daily. A list of the various supplies is furnished to each man, and it is estimated that he will cover his field in three to four weeks. The chemical squad takes samples from wagons, about sixty-five a week in all. It will thus be noted that from 1,600 to 1,800 samples for bacteriologic and chemical analysis are taken per week for milk inspection purposes.*

It is proper to state that for a considerable portion of the information given in this paper I am indebted to a monograph bearing the name of Lederle & Raynor, published by the Department of Health, and to the paper by Russell Sturgis, Chief of the Division of Milk Inspection, heretofore alluded to.

It is perhaps unnecessary for me to state that my recent connection with the New York City Health Department has made it impossible for me to prepare this paper without much help from others.

* It should be stated that this has been much increased since this paper was read.

Experience of New York in Grading Market Milk 677

TABLE 1—1912.

GRADE A.

(1) <i>Certified or Guaranteed</i>	
(2) <i>Inspected Raw</i>	
Dairies: Equipment	25
Methods	50
Bacteria: 60,000 per cc.	
(3) <i>Selected Pasteurized</i>	
Dairies: Equipment	20
Methods	40
Bacteria: 200,000 before 50,000 after	Pasteurizing

GRADE B.

(1) <i>Selected Raw</i>	
Dairies: Equipment	25
Methods	43
Bacteria shall not be excessive	
(2) <i>Pasteurized</i>	
No dairy standard	
No bacteria standard	

GRADE C.

<i>For Cooking</i>	
At first allowed raw—later required heated or pasteurized	
No standards	

TABLE 2—1914.

GRADE A.

(1) <i>Raw</i>	
Dairies: Equipment	25
Methods	50
Bacteria: 60,000 per cc.	
(2) <i>Pasteurized</i>	
Dairies: Equipment	25
Methods	43
Bacteria: 200,000 before 30,000 after	Pasteurizing

GRADE B.

<i>Pasteurized</i>	
Dairies: Equipment	20 at present
Methods	35 not enforced
Bacteria: 1,500,000 before pasteurized in city 300,000 before pasteurized in coun- try	
100,000 after pasteurized	

GRADE C.

<i>Pasteurized</i>	
Dairy total	40
Bacteria	300,000

WILL ORGANIZE WORKING MEN IN TUBERCULOSIS FIGHT.

Organization of all of the working men and women of the United States, including the systematic collection of funds from both employers and employees for local anti-tuberculosis campaigns, is proposed in a report issued today by The National Association for the Study and Prevention of Tuberculosis, entitled "Working Men's Organizations in Local Anti-Tuberculosis Campaigns."

The report discusses various experiments that have been tried by working men in different parts of the United States to organize for effective service in the anti-tuberculosis campaign, and recommends a plan which would comprehend the following features, based upon the best in all the schemes studied:

(1) A simple organization representing employers and employees closely allied with the local anti-tuberculosis society of the community. The organization will provide for the establishment of a tuberculosis fund either on the basis of individual factories or groups of factories.

(2) A plan for collecting funds to be used for the relief of tuberculous workers and their families by free will offerings from employers and employees. Employers will be urged in all cases to duplicate the joint collections of employees. The collections will not be a tax or assessment, and will constitute a special tuber-

culosis fund in addition to those of regular benefit societies.

(3) A systematic campaign for medical examination of all workers at yearly or more frequent intervals.

(4) The appointment of special committees to give relief to fellow-workers and their families suffering from tuberculosis from the funds collected. Any worker in a community where a fund is started who develops tuberculosis will be cared for.

(5) Carrying on of educational and legislative work through the organization.

(6) The collection of statistics about occupational mortality from tuberculosis.

Every anti-tuberculosis association in the United States will be urged to use this report as a basis for organizing the factories and shops in its community in the anti-tuberculosis campaign. "This is not the best form of coöperation of workers in the anti-tuberculosis campaign" says the report. "The ideal form would be the adoption of the German or British health and sickness insurance plans to American experience. The plan proposed here is a near approach toward insurance against tuberculosis since it proposes coöperation of the worker, the employer and the state, the latter in caring for consumptives in public institutions at reduced rates."

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INFANTILE PARALYSIS IN NEW YORK CITY.

New York City's visitation of infantile paralysis, with the resulting widespread publicity and grave public alarm, gives this disease a particular current interest. We are reminded how the public was aroused over a country-wide prevalence of infantile paralysis a few years ago and also how the country forgot it when the crest of the wave had passed.

The number of cases reported brings the New York situation undeniably within the somewhat elastic classification "epidemic." The alarming suddenness with which the epidemic flamed up, the large number of cases and the apparently high case mortality all combine to make the name of infantile paralysis a fearsome one to the parents of young children.

While our knowledge concerning this disease has increased wonderfully during the past few years, it is by no means complete. There is obviously something lacking. It is to be hoped that the sad experience of the present days may add more light to an obscure subject.

Ignorance in matters dealing with pestilential disease is the chief breeder of fear. It is a good sign of the times to be able to quote the following sensible editorial from the *Boston Journal* of July 3:

"One of the first precautions to be taken in fighting an epidemic has to do with the psychological side of the situation; the authorities must consider the public mind, and keep that mind free of the hysteria and panic which, more often than not, intensify and spread the calamity. Governments knew that, even in the olden times when secrecy was the only method of preventing panic. Secrecy, of course, is no longer practised in enlightened communities.

"The modern policy of publicity and education in combating disease has nowhere been given better illustration than in New York's present campaign against the terrible and increasing epidemic of infantile paralysis there.

"New York's total number of cases, 379 up to last Saturday, is proportionately no greater than the number found in many smaller cities in recent years, but as a total it looks large, and without the precaution of a cool and sensible educational effort by the health authorities the mental state of the city would be uncomfortable indeed.

"Plague panics have been many. . . . Except for modern methods of handling the multitude, mental conditions today might very well coincide with those of other days when the plague was as little understood as infantile paralysis is today. Uninformed people of today might, like those of centuries ago, adopt their own futile and foolish means of avoiding the monster, were it not for the careful publicity managed by the local governments. The press performs a mighty service in such emergencies. In the age of the plague there were no such advantages. The New York papers, with daily reports in detail, are at the right hand of the Health Department.

"As for the disease known as infantile paralysis—the medical profession, after years of research, is still so baffled as to be unable to explain the scourge or to offer a certain remedy for it. It steals upon a community from unknown sources, strikes this way and that, respecting neither filth nor cleanliness, neither health nor strength, and dealing death and deformity on its way. The records show that it attacks healthy children rather than the unhealthy; in rich homes and in poor; nor are adults immune.

"Contrary to a theory much in vogue a few years ago, many eminent doctors now declare the germ is not carried by insects. . . . The mucous membrane is known to carry the disease, and communication can be effected through coughing or kissing. Northern Europe is held guilty as the breeding ground of infantile paralysis, but no corner of the world is free of it, and no season of the year is clear of it, although the height of its ravages is reached in August.

"The country, too, stands to learn much from New York's experience. Organized effort for protection of the public health has been none too strong anywhere. We find useful lessons in this as in all calamities."



RELIABILITY OF STATEMENTS OF CAUSE OF DEATH FROM THE CLINICAL AND PATHOLOGICAL VIEWPOINTS.

HAVEN EMERSON, M. D.,
Commissioner of Health, New York City.

Read before the Vital Statistics Section, American Public Health Association, Rochester, N. Y.,
September, 10, 1915.

IT WOULD be superfluous to call more than passing attention to the necessity of scrutinizing the quality of the raw material from which such elaborate conclusions are manufactured as appear in the course of the analysis of mortality statistics. We may or may not permit ourselves to draw any reasonable lesson from the figures, according to the accuracy of clinical observations and the completeness of the recording of deaths. With the completeness of records we are not here concerned. This is a matter of administrative enforcement. I ventured at the risk of some quite natural resentment and criticism to call attention in a previous paper to the fact that little or no value attached to the reports of deaths from certain sources, notably from the coroner's office in New York City, and I recommended at that time that a forward step was indicated for registrars of health departments in separating the verified causes of death, as checked by pathologists' reports, from the records of deaths where insufficient data was available to justify an accurate statement. A beginning has been made in this direction in the Bureau of Records of the Department of Health, New York City.

It is evident that various clinical pictures of disease and certain surgical procedures offer either by direct observation or by the use of refinements of laboratory procedure as reliable a proof of the cause of death as does the examination of the dead body by the pathologist. However careful the subsequent analysis, and however complete the reporting of deaths, inaccuracy in the primary statement of the cause can never be overcome. The cause of this inaccuracy is the lack of thorough clinical and pathological training of physicians. Pending higher standards of medical education and the general

use of the autopsy to check the accuracy of clinical diagnosis, something more can be done to separate the certificates as presented, into groups, such as probably correct, and doubtful or questionable.

In studying the main headings of the international list of the causes of death as to their acceptability from the clinical and pathological viewpoint, we find many which are quite certain to be used only when direct observation during life, with or without verification obtained by operation, X-ray, or specific laboratory reactions, has justified the designation. Other causes are listed which may well be accepted if verified as the result of post-mortem examination of the body by a competent pathologist.

There remain, however, a number of headings which are commonly used by clinicians and represent unverified impressions or are susceptible of such various interpretations as to be unacceptable as causes of death.

As an instance of the change of designation which would result if all the reports from insane asylums were based upon autopsies, I would quote from a recent article by Enge, *Medizinische Klinik*, Berlin, June 20, 1915, XI, No. 25, pp. 687-714, in which he reports that, of 248 insane patients dying in an institution, 80 per cent. died from physical affections. Morbid conditions of the heart were found in 73.38 per cent. of the 248.

He found 26.61 per cent. of the mortality of Lubeck Insane Asylum for 16 years to be due to hypostatic or aspiration pneumonia, and 3.44 per cent. of mortality of men and 5.82 per cent. among the women to be due to cancer.

Of 248 cadavers studied, chronic nephritis was found in 48, pyelonephrosis in 4, fatty degeneration

tion of kidney in 7 and amyloid kidney in 1. The gall bladder was found diseased in 18.

Strecker (*loc. cit.*) found pathologic changes in the heart in 61.7 per cent. of men and 42.7 per cent. of women among 1,000 cadavers from the Dalldorf Asylum, and in only 27 per cent. and 23 per cent. respectively in 1,000 cadavers of non-insane.

Well-considered arguments, for the general use of the autopsy to correct clinical diagnosis of causes of deaths, and an excellent statement of the limitations of acceptability of statements of death, together with useful references, has appeared since this paper was read, viz.: *Journal of the American Medical Association*, October 16, Lewis.

Furthermore among the main headings properly listed as non-acceptable unless based on autopsy or other equally reliable supporting data, some sub-heads would not be used except with ample proof in hand of the validity of the report.

If, for the sake of argument, we separate the certificates of death as recorded, into those which have been made out after post-mortem examinations, and those in which no autopsy was performed, and further separate the latter (non-autopsied) group into acceptable and non-acceptable, we find that, although there are many headings properly falling in the non-autopsied acceptable group, the sum of these represents but an inconsiderable fraction of the total mortality.

If we analyze the causes of death which make up any large proportion of the total mortality, we find that many of these leading causes fall into the unacceptable group, that is, a group of causes of death which would be unacceptable to clinicians and pathologists in the absence of such confirmatory proof as post-mortem examination alone or equivalent specific proof during life could provide.

Of the 189 causes of death in the international list, I believe that 113 should be generally accepted when presented, whether a post-mortem examination has been made to verify the diagnosis or not. These acceptable headings are referred to only by number, as it is taken for granted that anyone interested enough to study the matter on his own account will be familiar with or have access to the international classification of causes of death. The remaining 74 headings appear to me to be generally unacceptable as causes of death upon which to base further study or from which to draw reliable conclusions, unless they are accompanied by post-mortem evidence or other data of equivalent value obtained during life.

The following consideration of these 76 headings is based on some familiarity with the errors in diagnosis observed during service as assistant attending physician at Bellevue Hospital, where the opportunity to verify clinical diagnosis was often presented at the city morgue. The opinions herein expressed have met with the approval of Dr. Charles Norris, pathologist of Bellevue and Allied Hospitals.

UNACCEPTABLE (WITH PROVISIO THAT IF SUPPORTING DATA IS PRESENTED THEY MAY BE RECEIVED IN ACCEPTABLE GROUP).

4. MALARIA: unless the presence of plasmodium malarie had been proved by examination of blood.
10. INFLUENZA: unless bacillus influenzæ is identified microscopically or biologically.
11. MILIARY FEVER.
23. RABIES.
25. MYCOSES: unless supported by microscopic proof of the mycelium.
29. ACUTE MILIARY TUBERCULOSIS: unless tubercles have been found in some accessible part of the body during life, as in the retina.

30. TUBERCULOUS MENINGITIS: unless proof of tubercle bacillus in spinal fluid is presented.
 31. ABDOMINAL TUBERCULOSIS: unless abdominal operation or recovery of tubercle bacillus from abdominal fluid is presented.
 37. SYPHILIS: unless diagnosis was based on lesions superficially situated or visible through body orifices, or confirmed by unquestioned Wassermann reaction.
 40. CANCER OF STOMACH AND LIVER
 41. CANCER OF PERITONÆUM, INTESTINES AND RECTUM
 45. CANCER OF OTHER ORGANS
- { unless operation
had been per-
formed, or the ne-
oplasm was other-
wise visible or ac-
cessible for direct
observation.
46. OTHER TUMORS (EXCEPT THOSE OF FEMALE GENITAL ORGANS).
 48. CHRONIC RHEUMATISM AND GOUT.
 53. LEUCÆMIA
 54. ANÆMIA AND CHLOROSIS
- { unless report of microscopic blood examina-
tion is presented.
55. OTHER GENERAL DISEASES.
 57. CHRONIC LEAD POISONING.
 58. OTHER CHRONIC OCCUPATION POISONINGS: unless lesions were superficial, or were accessible to direct inspection, or chemical or microscopic proof was obtained.
 59. OTHER CHRONIC POISONINGS: unless presence in the body of the particular poison has been proved.
 60. ENCEPHALITIS
 61. SIMPLE MENINGITIS
- { unless operative or microscopic proof, as in spinal
fluid, is presented.
63. OTHER DISEASES OF THE SPINAL CORD.
 64. CEREBRAL HÆMORRHAGE AND APOPLEXY.
 65. SOFTENING OF THE BRAIN.
 66. PARALYSIS WITHOUT SPECIFIED CAUSE.
 67. GENERAL PARALYSIS OF THE INSANE.
 68. OTHER FORMS OF MENTAL ALIENATION.
 69. EPILEPSY: unless death occurred in a major attack and was witnessed.
 70. CONVULSIONS (5 YEARS AND OVER).
 71. CONVULSIONS (UNDER 5 YEARS).
 73. NEURALGIA AND NEURITIS.
 74. OTHER DISEASES OF THE NERVOUS SYSTEM.
 77. PERICARDITIS: unless the inflammatory exudate was obtained on paracentesis.

79. ORGANIC DISEASES OF THE HEART
97. PULMONARY EMPHYSEMA

In spite of the accuracy with which the characteristic physical signs of the classical cardiac and pulmonary lesions can be demonstrated by a competent physician, the frequency of error as disclosed by autopsy, and the habit of assigning to this heading deaths from doubtful or obscure causes, will explain the inclusion of this heading among the unacceptable group, unless supported by autopsy. The importance which this heading is assuming in the present-day discussion of the incidence (increasing?) of diseases of degeneration affecting the age groups over 40, requires us to scrutinize our basic facts before determining the need or character of the campaign for prevention which is urged by those who rest satisfied with the clinical diagnoses of today.

81. DISEASES OF THE ARTERIES, ATHEROMA, ANEURISM, etc.: except where an aneurism is visible or accessible to direct observation.
82. EMBOLISM AND THROMBOSIS: unless operation has disclosed the nature of the obstruction.

83. DISEASE OF THE VEINS
84. DISEASES OF THE LYMPHATIC SYSTEM
85. HÆMORRHAGE; OTHER DISEASES OF CIRCULATORY SYSTEM

except when accompanied by report of operative procedure, or direct observation of lesion.

96. ASTHMA.
98. OTHER DISEASES OF THE RESPIRATORY SYSTEM (TUBERCULOSIS EXCEPTED): unless exploration has provided positive evidence as of abscess or asperigillosis.
101. DISEASES OF THE ŒSOPHAGUS: unless direct inspection or measurement is the basis of diagnosis.

102. ULCER OF THE STOMACH: unless operation has exposed the lesion to view.
103. OTHER DISEASES OF THE STOMACH (CANCER EXCEPTED): unless the evidence is given, as possible in fistula, foreign body, gastrectomy (and other surgical procedures involving stomach), or laceration of stomach.
108. APPENDICITIS AND TYPHILITIS: unless diagnosis is verified by operation.
109. HERNIA: if visible, by virtue of position on body surface or exposed by operation.
110. OTHER DISEASES OF THE INTESTINES: unless diagnosis is based on observation as result of operation.
111. ACUTE YELLOW ATROPHY OF THE LIVER.
112. HYDATID TUMOR OF THE LIVER: unless evidence of character of tumor by microscopic examination of tumor contents is provided.
113. CIRRHOSIS OF THE LIVER: unless abdominal paracentesis has been repeatedly performed with withdrawal of fluid, and exclusion of passive congestion, syphilis and neoplasm has been determined.
114. BILIARY CALCULI: unless specimen was recovered or diagnosis is based on operation and inspection.
115. OTHER DISEASES OF THE LIVER: unless diagnosis is based on operation and inspection.
116. DISEASES OF THE SPLEEN: except splenotomy.
118. OTHER DISEASES OF THE DIGESTIVE SYSTEM (CANCER AND TUBERCULOSIS EXCEPTED) { unless surgical procedure is basis of diagnosis.
122. OTHER DISEASES OF THE KIDNEYS AND ADNEXA {
123. CALCULI OF THE URINARY PASSAGES { unless operation or direct inspection
124. DISEASES OF THE BLADDER { has been availed of.
130. OTHER DISEASES OF THE UTERUS { unless cause assigned is direct
132. SALPINGITIS AND OTHER DISEASES OF THE FEMALE GENITAL ORGANS { result of operative procedure or surgical accident specified, or the lesion to which death is attributed is accessible to direct inspection.
140. FOLLOWING CHILDBIRTH (NOT OTHERWISE DEFINED).
151. CONGENITAL DEBILITY, ICTERUS, AND SCLEREMA.
 - (1) PREMATURE BIRTH (NOT STILLBORN): the headings under this subdivision may properly be accepted.
 - (2) CONGENITAL DEBILITY: the headings under this subdivision are not acceptable without autopsy.
152. OTHER CAUSES PECULIAR TO EARLY INFANCY.
 - (1) INJURIES AT BIRTH (NOT STILLBORN): the headings under this subdivision may properly be accepted.
 - (2) OTHER CAUSES PECULIAR TO INFANCY: the headings under this subdivision are acceptable only where the lesion or the evidence of it is apparent on direct inspection.

- 153. LACK OF CARE.
- 154. SENILITY.
- 155. SUICIDE BY POISON: only when the poison supposed to have been used is found on examination of body fluids or visceral contents.
- 156. SUICIDE BY ASPHYXIA: unless identity of gas is proved upon the body.
- 158. SUICIDE BY DROWNING: unless the act was witnessed.
- 164. POISONING BY FOOD: unless specific organisms are obtained from food used.
- 165. OTHER ACUTE POISONINGS: unless the taking or the administration of the poison was witnessed.
- 169. ACCIDENTAL DROWNING: unless the act was witnessed.
- 186. OTHER EXTERNAL VIOLENCE: unless violence was witnessed and visible damage of sufficient degree to cause death is reported.
- 187. ILL-DEFINED ORGANIC DISEASE.
- 188. SUDDEN DEATH.
- 189. CAUSE OF DEATH NOT SPECIFIED OR ILL DEFINED.

Of the total number of headings, 23 are not to be accepted as reliable without autopsy; 53 are to be accepted only if specific supporting data has been obtained upon which diagnosis was based; 113 are to be accepted as reliable without autopsy or other verification.

Of the total mortality of New York City in 1914, 2,875 or 3.8 per cent. fall under the first classification (not to be accepted as reliable without autopsy), 27,995 or 37.4 per cent. fall under the second classification (to be accepted only if specific supporting data has been obtained upon which diagnosis was based), and 43,933 or 58.8 per cent. fall under the third classification (to

be accepted as reliable). That is, tested by clinical and pathological standards, 41.2 per cent. of recorded deaths are from questionable causes.

The proposal presented to separate acceptable and questionable groups appears to me a necessity for the sake of further progress in the prevention of disease. I believe the matter should be studied in detail by a committee of statisticians, pathologists and clinicians, and presented to the international commission for adoption as a classification to be used now and modified as improvements in clinical skill and methods of precise diagnosis permit.



TUBERCULOSIS MOVEMENT INCREASED 1600 PER CENT. IN 12 YEARS.

Statistics made public recently by The National Association for the Study and Prevention of Tuberculosis show that nearly 3,000 agencies are now listed in the fight against tuberculosis in the United States, an increase of 1600 per cent. since 1904, when the national warfare on this disease was started. These figures are taken from a new tuberculosis directory just issued by the Association.

The list includes 557 sanatoria and hospitals, 158 tuberculosis boarding houses, 90 hospitals for the insane and 35 penal institutions making special provision for tuberculosis, 455 dispensaries, 310 open air schools, and 1,324 anti-tuber-

culosis associations and committees. To these are added 158 Canadian institutions and associations, making a total of 3,087. The directory also gives a summary of municipal and state legislation on tuberculosis.

When the National Association was formed in 1904 and the first list of agencies was printed, only 183 organizations and institutions were found. The second edition of the Directory in 1908 reported 649 different agencies; and, 1,440 were listed in the third edition published in 1911. On the basis of the latter figures, the number of agencies in the anti-tuberculosis movement has increased 115 per cent. in the last five years.

COMPARATIVE BACTERIOLOGICAL EXAMINATION OF SHELL LIQUOR AND MEATS OF OYSTERS.

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Read before the Laboratory Section of the American Public Health Association, Rochester, N. Y., September 10, 1915.

DURING the last twenty-five years there have been various methods used for the bacteriological examination of oysters. These methods may be classified as follows:* (1) Examination of the shell liquor; (2) examination of the minced oyster meat or of a portion of the oyster so removed as to contain a part of the intestine; or (3) a combination of the two methods. The first method is by far the easiest and is the one which has been in common use for the past few years.

The most interesting feature of all work done on the bacteriology of the oyster is the fact that no one has mentioned the mucus in the liquor or on the body of the oyster or apparently considered that it played any part in the bacteriology of shellfish. The mucus is so self-evident that it seems impossible that it should have been entirely neglected. This mucus serves two purposes: (1) It acts as a protection to the body of the oyster just as the mucus of the dog-fish and other selachians protects their skin from the deleterious influences of the salt water. (2) The other and more important function from the bacteriological point

of view is that it serves as a net for the entrapping of the food of the oyster such as diatoms and algæ and other microscopic organisms.† As a consequence a large percentage of the bacteria in the filtered water gets entangled in the mucus.

Everyone who has handled oysters is familiar with the slime that clings to the oyster meat and the difficulty with which it is removed. If one collects the liquor from an opened oyster and lets it stand for a short time in a tube or bottle it will be seen that it separates into two layers, a heavy, viscous layer at the bottom and a clear, limpid layer above. The bottom layer is the mucus which precipitates out. Of course this mucus interferes a great deal in getting an even suspension of the shell liquor. But aside from the part played by the mucus in the liquor the mucus left on the body of the oyster is, generally speaking, much more important. Usually much more mucus is left upon the body of the oyster than is found in the shell liquor and as the mucus is the part of the oyster that catches and holds the bacteria it follows that often there are more bacteria, espe-

* A review of the various methods will be found in Round, "Contributions to the Bacteriology of the Oyster," pages 1 to 88, published by the Commissioners of Shellfisheries of Rhode Island, 1914.

† Considerable evidence has been brought forward recently indicating that diatoms and algæ form but a small percentage of the food of the oyster.

cially of the *B. coli* type, left on the body of the oyster than are found in all the shell liquor. Since the ratio between the number of bacteria in the liquor and on the body of the oyster varies greatly, it follows that the examination of the shell liquor is a very poor index of the number of bacteria really present in the oyster. This is especially true of bacteria of the *B. coli* type.

The idea of comparing the bacteriological content of the shell liquor and of the body of the oyster is not new. Houston* performed a number of experiments to determine this point. Houston's work, however, took no account of the mucus on the body of the oyster. He thought that by pouring water over the body of the oyster he could remove all the bacteria present. Accordingly he collected the liquor from the opened oysters in a flask and placed the oyster meats upon a sterile wire gauze in a sterile funnel. He then poured sterile water over the oyster meats and added this to the oyster liquor. He then determined the number of *B. coli* per cc. of this liquid and the average number per cc. of oyster liquor. The oyster meats were removed from the funnel, cut up with sterile scissors and macerated with sterile water. The average number of *B. coli* for the meat of each oyster was then determined. He assumed that all the bacteria were washed from the body of the oyster by simply pouring water over it. He also assumed that all the bacteria coming from the macerated bodies came from the stomach.

Further he assumed that all the bacteria could be removed from the stomach and intestine of the oyster by simple maceration. Under these assumptions he concludes that "volume for volume the oyster liquor contains 30 times as many bacteria as the oyster body." But assuming that all the bacteria from the macerated bodies came from the stomach and that the stomach contents is $1/10$ cc. he concludes that "on this assumption the coli-like microbes were three times more numerous per unit of volume in the stomach or intestinal juice than in the oyster liquor."

The assumptions upon which this reasoning is based are contrary to fact. The experiments of the writer (*loc. cit.*) have shown that the bacteria on the outside of the body are dislodged with great difficulty and that simply rinsing in water will remove only a small percentage of them. Further the analysis of the shell liquor and of the stomach contents of 41 oysters showed that in only two instances was the number of bacteria per unit volume in the stomach contents greater than in the shell liquor. In one instance the numbers were equal. In the remaining 38 oysters there were many more per unit volume in the shell liquor than in the stomach contents. The ratio per unit quantity in these 38 oysters varied from 3 to 2 to 2,000 to 1. Taking the average of the 41 oysters as a whole there were more than twenty times as many bacteria per cc. in the shell liquor as there were in the stomach contents. From these experiments and others to be detailed later it is fair to assume

* Fourth Report of Royal Sewage Commission, Vol. III, 1904.

that Houston's results are a comparison of the bacteria in the shell liquor with those on the body of the oyster, but owing to his technique the figures do not show the actual numbers that could be washed from the bodies of the oysters.

Consideration of the biology of the oyster led the writer to believe that the mucus played a part in the bacteriology of the oysters hitherto unappreciated. Accordingly, the following experiments were performed.

September 29, ten oysters were collected from the beds and taken immediately to the laboratory and examined at once in the following manner: the oysters were opened according to "Standard Methods" and the liquor drained into a small bottle graduated into two cc. divisions. The oysters were allowed to drain until a drop would not come away at least every five seconds. The amount of liquor was then read off and an equal amount of sterile salt solution added and the whole shaken vigorously one hundred times. The body of the oyster was removed from the shell and placed in a sterile jar and a quantity of sterile salt solution added equal to the quantity of the shell liquor. The jars were covered and allowed to stand a few minutes while the oyster juice was being inoculated into petri dishes and bile fermentation tubes. The oyster meats and salt solution were then stirred vigorously with a sterile pipette and an attempt was made to remove as much of the mucus from the body of the oyster as possible. Then one cubic centimeter of the solution and dilutions thereof were inoculated into

agar plates and bile fermentation tubes in the same manner as in the case of the oyster juice. A careful record was kept of the number of cubic centimeters of juice obtained from each oyster and the amount of salt solution used in washing each oyster in order to make a comparison of the bacterial content of all the shell liquor with the total number of bacteria washed from the bodies of the oysters. This would show which part contained the greater number of bacteria.

The same experiment was repeated with oysters obtained October 7. The total number of bacteria found in the shell liquor and the washings from the bodies of the oysters is shown in the following table:

TABLE SHOWING THE TOTAL NUMBER OF BACTERIA IN THE SHELL LIQUOR OF EACH SAMPLE AND THE TOTAL NUMBER WASHED FROM THE BODIES OF THE SAME OYSTER WITHOUT SHAKING.

		20°C. count.	B. coli count.
Sept. 29	Shell liquor.....	330,000	7,400
	"Washings".....	48,000	1,700
Oct. 7	Shell liquor.....	480,000	5,900
	"Washings".....	50,000	850

These results did not equal the writer's expectations and it was thought that perhaps the treatment of the oyster meats was not sufficient to remove all the mucus and bacteria present. Accordingly the following method of analysis was adopted for the subsequent experiments: The oyster liquor was collected and diluted as

before. It was shaken vigorously one hundred times before inoculation into the agar plates and bile fermentation tubes. The body of the oyster was transferred after draining to a sterile large-mouthed, glass-stoppered bottle and covered with twenty cubic centimeters of 1 per cent. salt solution. The oysters and salt solution were shaken vigorously one hundred times, and the solution of salt and mucus was removed with a pipette or poured aseptically into a smaller glass-stoppered bottle and again shaken vigor-

ously one hundred times. This mixture was then inoculated into the bile tubes and the agar plates. At first a 1 per cent. solution of sodium carbonate was used with the hope that it would cut the mucus more readily, but later the salt solution was found to be just as effective. The shaking appeared to be the important factor.

It was found that a great deal of shaking was necessary in order to break up the clumps of bacteria and separate them from the mucus. If not thoroughly shaken, the resulting

TABLE SHOWING THE TOTAL NUMBER OF BACTERIA IN THE SHELL LIQUOR OF EACH SAMPLE OF TEN OYSTERS AND THE TOTAL NUMBER WASHED FROM THE BODIES OF THE OYSTERS BY SHAKING.

	No. of experiment.		20°C. count.	37°C.		B. coli count.
				Total count.	Red* count.	
October 13	1	Shell liquor.....	650,000	.....	.....	4,800
		"Washings".....	500,000	.....	.....	14,000
October 23	2	Shell liquor.....	190,000	.....	.....	178
		"Washings".....	45,000	.....	.....	500
October 27	3	Shell liquor.....	200,000	.....	.....	113
		"Washings".....	100,000	.....	.....	2,080
October 31	4	Shell liquor.....	50,000	.....	.....	2,500
		"Washings".....	24,000	.....	.....	3,200
November 3	5	Shell liquor.....	78,000	.....	.....	2,000
		"Washings".....	15,000	.....	.....	2,600
November 8	6	Shell liquor.....	1,050,000	.....	.....	17,000
		"Washings".....	140,000	.....	.....	8,800
December 6	7	Shell liquor.....	100,000	39,000	10,000	4,000
		"Washings".....	15,500	6,900	1,500	4,400
December 19	8	Shell liquor.....	130,000	30,000	3,000	850
		"Washings".....	35,000	3,000	800	275
June 19	9	Shell liquor.....	.....	.....	.....	12,200
		"Washings".....	.....	.....	.....	46,000
June 23	10	Shell liquor.....	.....	.....	.....	130,166
		"Washings".....	.....	.....	.....	404,200
June 29	11	Shell liquor.....	.....	.....	.....	27,720
		"Washings".....	.....	.....	.....	252,200

*Red count indicates the acid-formers in litmus-lactose agar.

plates would be found to contain large areas of confluent colonies which rendered counting impossible. Every bit of mucus would be found to be a nucleus around which would be a large confluent ring of colonies. After a thorough shaking, however, the bit of mucus would be found in most cases to be sterile and the bacteria would be found in well separated colonies evenly distributed in the medium. The following table shows the results of these experiments:

In comparing the total number of bacteria in the shell liquor of all the oysters in each of the experiments with the total number washed from the bodies of these oysters it is seen that the total number of bacteria in the shell liquor of all the oysters was greater than the number washed from the bodies of the oysters. In the first experiment the numbers are nearly equal, but in the subsequent experiments there is a great difference. If we consider the individual oysters in all the experiments, we find that in only ten of the oysters out of seventy-seven was there a greater number of bacteria washed from the body than was found in the shell liquor of the corresponding oyster. In one instance the numbers were equal. In the remaining sixty-six oysters there were more bacteria in the shell liquor that were washed from the bodies of the oysters. The 37°C. count and the "red count" were made on only seventeen oysters and in only two instances did the number of bacteria washed from the bodies of the oysters exceed the number found in the shell liquor, while the total number from all the oysters of the two

experiments showed that there were on the average a great many more in the shell liquor than were washed from the bodies of the oysters.

When we consider the number of *B. coli* found in the shell liquor and the number washed from the body of the same oyster we find the relative numbers quite different. It will be seen in nine out of the eleven experiments the total number of *B. coli* washed from the bodies of all the oysters of the experiment exceeded the total number in the shell liquor. In the first two and the last three experiments the difference is especially marked. If we consider the individual oysters we find that in forty-eight instances there were more *B. coli* on the body of the oyster than were in the shell liquor; in thirty-five oysters the number in the shell liquor exceeded the number washed from the body; in fourteen instances the numbers were equal. But if we consider the total number of *B. coli* found in the "washings" with the total number found in the shell liquor of all the oysters examined in this series of experiments, we find there were on the average more *B. coli* in the "washings" than there were in the shell liquor.

We have no reason at present to suppose that *B. coli* should be distributed other than equally among the other bacteria in the oyster, yet there seems to be a concentration of *B. coli* in the mucus on the outside of the body of the oyster. The amount of shell liquor in the oysters averaged about ten cubic centimeters. If we consider that there was left upon the body of the oyster one cubic centi-

meter of mucus, we find that there were volume for volume more than ten times as many *B. coli* on the body of the oyster as there were in the shell liquor. During the warm weather the ratio is several times greater. The question arises at once as to whether this unequal distribution of *B. coli* among the other bacteria in these two parts of the oyster is real or only apparent. It may be due to the difference in methods of analysis.

This relationship between the bacterial content of the shell liquor and the mucus on the body of the oyster has been known but has been attributed to other causes, hence the real reason has been obscured. Thus the Committee on Standard Methods for the Examination of Shellfish in their second report* state that for shucked stock higher dilution should be used than for the examination of shell stock.

While *B. coli* will undoubtedly multiply in oysters under certain conditions, the writer has kept oysters in the shell at a temperature of 10° C. and examined them from time to time for eighty days and did not note any material increase or decrease in the *B. coli* content during the period.†

Another point which appears interesting to the writer is that there is apparently a direct relation between the temperature of the water from which the oysters are taken and the relative number of *B. coli* found in the shell liquor and on the body of the oyster. It will be noticed that in the first three experiments there were a great many more *B. coli* on the body of the oyster than in the shell liquor, but this proportion is gradually reduced and in the sixth and eighth experiments there were more *B. coli*

TABLE ARRANGED ACCORDING TO TEMPERATURE SHOWING THE APPROXIMATE RATIO OF THE TOTAL NUMBER OF BACTERIA IN THE SHELL LIQUOR TO THE NUMBER IN THE WASHINGS FROM THE BODIES OF THE OYSTERS IN EACH SAMPLE.

Temperature.	Date.	20°C. count.	37°C.		B. coli count.
			Total count.	Red count.‡	
16°C.	Oct. 13	1.3:1	....	....	1:3
16°C.	Oct. 27	2:1	....	....	1:18
13.5°C.	Oct. 23	4.2:1	....	....	1:2.8
13°C.	Oct. 31	2:1	....	....	1:1.3
12°C.	Nov. 3	5.2:1	....	....	1.3:1
12°C.	Nov. 8	7.5:1	....	....	2:1
8°C.	Dec. 6	6.5:1	6:1	7:1	1:1.1
6°C.	Dec. 19	3.7:1	10:1	4.7:1	3:1
Exact temperature unknown	June 19	....	....	....	1:3
	June 23	....	....	....	1:3.1
	June 29	....	....	....	1:9

* JOUR. AM. PUB. HEALTH, Vol. II, 1912, p. 34.

† Contributions to the Bacteriology of the Oyster (*loc. cit.*).

‡ Red count indicates acid-formers in litmus-lactose agar.

in the shell liquor than were found on the bodies of the oysters. The ratio of the total number of bacteria in the shell liquor to the total number washed from the bodies of the oysters in each sample is shown in the preceding table:

Thus in October when the water was warm there were always more colon bacilli on the bodies of the oysters than in the shell liquor. During November and December when the water had cooled down considerably the ratio changed and there were always more colon bacilli in the shell liquor than on the bodies. In June, when the water had become warm again, the relation changed and approximated that which obtained during the warm fall months. This condition is not so different from that which we might expect when we consider the biology of the oyster.

The optimum temperature for the growth of the oyster is probably between 20°C. and 25°C. At this temperature the cells of the oyster are most active. The mucus cells will secrete a larger amount of mucus and the gills will filter a larger amount of water than at decidedly lower temperatures. The more mucus secreted the more will remain clinging to the body of the oyster. Generally speaking, the greater the amount of mucus secreted and the greater the quantity of water filtered the greater the number of bacteria we would expect to find in the mucus on the outside of the body. As the temperature of the water lowers, the metabolic processes of the oyster are correspondingly slowed and the smaller the amount of mucus is secreted

and a smaller quantity of water filtered and for this reason fewer bacteria will be found on the body of the oyster. For this reason it seems fair to assume that the apparent relation between the temperature of the water and the proportion of *B. coli* on the outside of the oyster and in the shell liquor is real and not accidental.

These two sets of experiments throw light upon the findings of Houston cited above. It is easily seen that the simple pouring of water over the body of the oyster is not sufficient to remove all the bacteria. The experiments of the writer on the comparison of the bacterial content of the stomach and the shell liquor shows that per unit volume the shell liquor contains on the average over twenty times as many bacteria as the stomach juices. Evidence from all sides shows that Houston's assumptions that all the bacteria were washed from the body of the oyster by simply pouring water over the oyster, and further that the bacteria found in the minced meat of the oysters so treated came entirely from the stomach, are not in accordance with the facts.

From these experiments it can be seen that for experimental work, in which one wishes to make comparative bacteriological determinations of the oysters in the shell and of shucked oysters from the same lot during various steps in handling in the opening house or during shipment, one must employ a method of examination which is applicable to both shell and shucked oysters and which uses, in all cases, so far as possible, the same material for examination.

In 1914 the writer, in the work previously referred to, described a method of analysis which included the examination of both the shell liquor and the mucus from the body of the oyster. While this method has since been used to some extent and is theoretically more accurate in determining the bacterial content of shell oysters, it has for comparative work the same disadvantage as the examination of the shell liquor, namely, that it is not applicable to the examination of shucked oysters because the shell liquor is included with the washings from the oyster meats. With the object of having a method of analysis applicable to both shell and

opened stock and so make the results of the analysis of both comparable, Mr. Bates, of the Bureau of Chemistry, and the writer have modified the method previously advocated by the writer in 1914 by discarding the shell liquor and using only the washings from the bodies of the oysters.* This brings the examination of shell and opened stock to the same basis and gives for experimental purposes a method of comparison which is impossible in the present "Standard Methods."

* Bates and Round: Comparative Bacteriological Examination of Shell Liquor and Meats of Oysters. Paper read before the 41st Annual Meeting of the Am. Pub. Health Assn., Rochester, N. Y., Sept. 6-10, 1915.



ENGLAND WARS ON CANCER.

That the policy of "business as usual" applies to constructive efforts for the prevention of disease in England is evident from the publication by the Central Midwives Board as recently as March 16, 1916, of a new circular on cancer of the breast. The practice of midwifery in England and Wales is controlled by this Board and the circular is the newest of a series issued for the instruction of all women practising this profession and registered with the Board as required by the law. The leaflet on cancer of the breast was prepared by the Chairman, Dr. F. H. Champneys, F. R. C. P., and is distributed to the public as well as to midwives.

Pointing out that cancer of the breast, unless treated by early removal always ends in death, Doctor Champneys states that the disease is at first only in the part affected and not in the system. "Every day and even every minute," the circular says, "is of importance and no time at all should be lost. The earliest symptom is a lump in the breast which is usually painless and may be quite small. It may remain without seeming to grow for some time. The only cure for it is early removal. Although it is often easy to be sure that a lump is cancerous, many lumps

which begin by being innocent turn into cancer some times after many years."

Doctor Champneys advises that all lumps except those caused by undoubted and recent inflammation should be removed as soon as they are found and advises all women who discover a lump in the breast to consult at once a surgeon who is in the habit of dealing with them. If the lumps are not removed and are cancerous the disease sooner or later spreads through the body and becomes incurable, while if the lumps are not cancerous they may become so. "The removal of an early lump," the leaflet goes on to say, "is generally simple and if microscopic examination should show afterward that it was not cancerous a danger for the future will have been averted and the anxiety of the patient and her friends will be relieved." From such an operation there is generally "practically painless recovery in a few days. If the lump proves to be cancerous, however, a further operation is necessary, which, if undertaken early, saves many lives."

According to Doctor Champneys, if women would follow the above advice much loss of life, many regrets when too late, and much misery would be saved.

LIVE A LITTLE LONGER: THE TRIPLE ALLIANCE BETWEEN THE PUBLIC, THE PHYSI- CIAN AND THE SCHOOL.

MISS MELISSA E. BINGEMAN,

Secretary, Live a Little Longer, Committee, Rochester Chamber of Commerce.

Read before a General Session of the American Public Health Association, Rochester, N. Y., September 10, 1915.

THE platform upon which I stand cannot be overcrowded, even though it supports everyone present, as I assume is the case today. Please take a look at the planks which compose it. There are just three. Fitted together in a design known as the "syllogism" they form a "safe and sane" platform; a platform not to reason about, but from.

First.—In order to reduce any physical ailment to a minimum, the persons in a position to control or effect it must know its cause and how to combat it.

Second.—In a large proportion of cases the layman is in a position to combat disease, and in the majority of ailments he is the one upon whom prevention depends.

Third.—Therefore the layman should possess this knowledge.

By "layman" I mean not only the individual, but groups of individuals; the family, the community, in a word, the public.

A brief examination will show how reliable these planks are: "To reduce any ailment those in a position to effect it must know its cause and how to combat it." They must know its cause, in order to intelligently prevent. They must know how to combat it,

in order to help bring about the speediest and most permanent cure, in the greatest possible number of cases, with the least possible ill effects.

The reason some diseases are decreasing is that their cause, or method of transmission is known, and can, therefore, be avoided; the plague, yellow fever and malaria are among these. The reason others are on the decrease is that methods of successfully combating them have been found; among these are typhoid fever and malaria. And the reason still others are at a standstill, or on the increase, is that neither their cause nor a successful method of fighting them is known; most prevalent among these is cancer.

In short, the difference between preventing and not preventing; between curing and not curing, is largely the difference between knowing and not knowing. While we recognize that many original causes of sickness are beyond human control, such as sudden change of weather, for example, even in these the knowledge of how they affect us can be applied so as to avoid some of the undesirable affects.

The first plank, then, amounts to this, that to reduce sickness the necessary knowledge must be in the hands

of those in a position to apply it. And the second, that the layman is in a position to apply it, is equally unassailable. No matter to how great an extent recovery depends upon medical skill, it depends also upon the physical resources of the patient. And this depends in considerable measure upon what the patient himself, or some other person or persons, the patient's parents or children, husband or wife, employer or employees, the local governing body or the community of which he is a part, has known or not known at some time in the past.

But besides this indirect influence of the layman's knowledge upon the patient's physical condition, which condition may determine his chances for recovery, there is a more direct, or at least more palpable influence. In all slight ailments in which the physician is not called, and in the first stages of more serious sickness, before the physician is in attendance, the ignorance of some layman may reduce the patient's chances for recovery, or induce complications which might have been avoided; while on the other hand, the layman's knowledge may reduce suffering or induce recovery.

It is estimated that not over one tenth of the average general practitioner's patients are bed-ridden; and that at least 50 per cent. are up and about their business; and in the great majority of the latter class, what the patient himself knows or doesn't know affects his ailment for better or worse. Also, because the preliminary stages of diseases vary, so that while some may become serious in fifteen minutes, others may not appear serious in

fifteen years, there is great opportunity for the layman to work mischief with his ignorance.

So far as prevention goes, it is only necessary to look down the list of the most prevalent of what are known as preventable diseases to realize how largely prevention rests with the layman: in practically all infectious diseases and in all diseases induced by incorrect living. The beneficial results of educating the public are seen from our experience with the plague, yellow fever and malaria, tuberculosis and typhoid fever, which have decreased as the layman's knowledge of their cause and treatment has increased.

The practising doctor and nurse, indeed, have no opportunity to apply their knowledge until the mischief is done. They are the fire department, called in from the outside when the fire is making headway. They have had no opportunity to fireproof the building, to install sprinkler systems or to build fire-escapes. That is the duty of the layman.

Fearing to place health knowledge in the hands of laymen, lest they use it unwisely, fearing that knowledge may be dangerous, is on a par with fearing to use these means of safeguarding people against fire. The erection of fire-escapes is not opposed on the ground that people might use them when there is no occasion, and fall. People might do that, but, being intelligent, they don't. We do, however, safeguard the use of the safeguards. Fire-escapes must be accessible, and built of fire-proof material. They must be strong, with steps close enough together, and connected. We

do not tolerate gaps, nor consider a building equipped with fire-escapes if it has a short length of wooden ladder hanging out of a tenth-story window on one side, and another short length hanging out of a fifth-story window on another side.

And, just as we protect people against an unwarranted dependence upon fire safeguards, by making these as dependable as possible, so we should protect them against an unwarranted dependence upon disease safeguards, one of which is their own knowledge, by making this as dependable as possible. And the first thing that needs to be done is to see that the information given the public is reliable, the second that it is easily accessible, and the third that it is well-balanced.

The question is no longer Should the public know how to prevent sickness and how to care for the sick and injured? but What should the public know about this? not Shall the layman be instructed? but Who shall be responsible for instructing him? How, when, where, by whom, and at whose expense shall he be instructed?

The choice rests no longer between the horns of a dilemma—the “frying pan or the fire”; between the dangers of ignorance, on the one hand, and the dangers of a scant supply of unreliable, disconnected information on the other. There is a possible third choice. We can choose a balanced supply of reliable information.

In Rochester we are trying to make this way out of the dilemma so attractive that every woman in the city

will choose it. And this is our method: To give every woman in the city the opportunity to take a course of health lessons in the school nearest her own home, at a time convenient for her.

This is known as the *Live a Little Longer* plan, a name applied first as a slogan by School Commissioner J. Warrant Castleman, and does not mean that we want to add to the years of the centenarian, but that we want to increase the average length of life.

The plan is really a triple alliance between the public, the physician and the school. For what it proposes is not merely the occasional or intermittent use of the school buildings in which to instruct the adult layman in matters of health, but to make the utilizing of the schools for this purpose permanent. It caters to the modern craving for efficiency by making use of a by-product of our educational system, idle school room; and, by substituting a straight road to the coveted goal of public health education for the devious path which has hitherto been our only means of approach, it makes one wonder that we have so long been satisfied with the round-about way. If we really want accessible, balanced and trustworthy information, why have we not made it someone's business to supply it?

In Rochester the Board of Education stepped into the breach; which is as it ought to be. For this body is appointed by the people to manage local public education; is qualified for the task, and is entrusted with the funds appropriated for the purpose. The Board of Education took this

position: "Rochester schools claim to teach whatever has educational value, for which there is a demand. In health education there is undoubted educational value, but there has been no demand. Should this arise there is no reason why it should not be met."

The demand arose, and was brought to the attention of the Board in the form of a petition signed by almost three thousand women. This petition said: "Desiring to do our part in raising the average of health, efficiency and length of life, we, the undersigned, petition that there be furnished instruction in physiology, hygiene, disease-symptoms, dietetics, nursing and first aid at such hours as women could best take advantage of it; so that every woman in this city shall have the opportunity of gaining this most necessary information."

In response to this petition the Board of Education arranged a course of health lessons, which has now been given six times; as an afternoon course, from four to five o'clock, in five schools; and as an evening course has been given eight times in one up to time of printing. That women who are not employed outside of the home during the day find it a great deal more convenient to attend in the afternoon is evident. For, while in the evening class only 7 per cent. of the class were married, in all the afternoon classes from 60 to 90 per cent. were married.

The course consists at present of two lessons a week, for six weeks. As first offered it was composed of twenty-four lessons; and it may again be increased to include at least fourteen.

One lesson a week is taught by the physician, and the other by a trained nurse. Alternating the teachers makes it necessary to take precautions not to duplicate, nor yet to omit any essential.

The actual value of such health lessons depends, naturally, upon what is taught. And it is precisely here that the strength of this plan lies. Among the lessons taught by the doctor are: Physiology; cause, recognition and prevention of disease; rational principles for the cure of disease; diseases of children; emergency aid; motherhood. While among those taught by the nurse are: Care of infants and children; home nursing, which includes care of the patient and of the room, observing, recording and reporting symptoms; use and care of sick-room appliances; following the doctor's instructions in the administering of medicines; dietetics; bandaging, and so forth.

You see the course does not pay more attention to persons of one age than of another; that it is aimed equally at those diseases that reduce the population in an efficient, business-like manner; at those that do the damage but escape the blame, since they are not shown up in the census reports as responsible for many deaths, making other diseases serve as scape-goats; and at those degenerative diseases that take their toll of men and women who should be in their prime.

Teaching is preferable to lecturing, as its attendant asking of questions on the part of pupil and teacher reduces formality and increases the interest. But the features which undoubtedly do more than any others

to hold the interest of the class, and to help them to assimilate the information, are the illustrations, demonstrations and practice. For in oral instruction, with the facilities of the school at hand, it is possible to call in all these aids.

In physiology there can be the big folding manikin of the body. In emergencies, the class is shown how to improvise and apply splints and slings; how to bandage the various parts of the body; how to put out fire in a person's clothing. In nursing they are shown how to make and use swabs, pads, poultices and all kinds of local applications; how to give the various kinds of baths and rubs; how to make a bed both with and without the patient in it; how to change the patient's position, and in other ways make him as comfortable as possible, moving him with the minimum of exertion on the part of patient and nurse. In dietetics they are shown how to cook broths, beef-tea, starches and other dishes for the sick. And whenever possible these things are practised in class, the members using each other as subjects in the taking of pulse and temperature, or in bandaging; while they use the demonstration material in cooking and bed-making.

Many a thing which otherwise could be learned only by experimenting blindly upon a sufferer, or which could not be learned at all, without someone to show us, can be learned in these lessons. And this is but the beginning. The plan can be developed and improved as we learn from experience how to put into each lesson the maximum of instruction and interest.

There is no predicting how valuable such a course can in time be made. Ten years from now it may compare with the course being offered in Rochester this year as the automobiles of today compare with those of a decade ago.

The terms, in Rochester, have been a deposit of one dollar when the pupil registers at the beginning of the course; which dollar is returned at its close to all who have attended 80 per cent of the lessons. This helps to sustain the attendance. In three of the six courses given up to date, the dollar was returned to every member of the class. It is permissible to attend one lesson without making the deposit; and any member can bring a visitor, so long as the same person is not brought twice. The attendance of both pupils and visitors is, of course, taken at each lesson.

As to the size of the classes; this has run from one hundred and five, when the course was given in the East High School, which is situated in one of the best residential sections of the city, and which, as it was the first course offered, and more or less of an experiment, was permitted to draw attendance from anywhere in the city, down to about a dozen when the course was given in a school the surrounding population of which was largely foreign, many of the women in the neighborhood not being able to speak or understand English. When the course was, afterwards, given in this school in the evening, nearly thirty registered, and no better attendance or greater enthusiasm was met anywhere.

These classes, as can be expected, are always drawn from among the most intelligent persons in any community; as the more intelligent a person is, the more does he value knowledge, and the more promptly will he grasp such an opportunity. It takes longer to interest some people than others in anything educational; but if the opportunity is continued long enough the least interested will, in time, see its value.

There is no question that in a class numbering from fifteen to thirty the pupils are apt to receive more benefit in the same time than do the members of a larger class, since seeing is as important as hearing, and doing is as important as either. The expense is relatively greater with the smaller class—likewise the benefit; so it is left for the Board of Education to strike the balance. A class can easily be divided if it is considered too large.

A fifteen or twenty—even a twenty-four lesson course—can be repeated three times a year; while a twelve-lesson, which is a six weeks' course, can be repeated five times a year. In any case as many as desired can run concurrently. With four running at the same time, averaging thirty to a class, and repeating the course three times a year, three hundred and sixty women would receive the instruction annually, at an expense to the community of about \$1,400, or approximately three dollars per pupil, if the teachers are paid, as in Rochester, by the lesson. But the physician and the nurse could each teach a lesson every afternoon, and two evening classes a week, thus instructing eight classes

simultaneously. In this way, with forty in a class, and repeating the course five times a year, two teachers could give this instruction to sixteen hundred women a year. And this would cost in the neighborhood of \$4,000, or less than two dollars and fifty cents per pupil, if the teachers are employed by the year. When not teaching they could be engaged in other ways for the Board of Education.

The money which furnishes health education, however, would otherwise remain neither in the public treasury nor in someone's pocket. It is money which, unless we pay it voluntarily and directly to teach people how to reduce sickness, we pay involuntarily and indirectly in decreased efficiency and needless loss of life. According to the estimate made by President Roosevelt's Conservation Commission, that two thirds of present-day deaths are preventable—or postponable—there are, in a city of this size, about one thousand preventable deaths annually. Money paid to reduce this loss is not an expense, but an investment. Moreover, the amount concerned is negligible. To instruct sixteen hundred women a year, according to the schedule outlined, would cost the community less than one dollar out of every thousand collected in city taxes. It does not require an abnormally elastic imagination to conceive of less profitable methods of spending public funds.

Knowing that no matter how practical or how practicable this plan, or how valuable the subject-matter of the lessons, poor teaching could sign its death-warrant, I sent to twenty hospital superintendents and twenty uni-

versities, questionnaires designed to ascertain whether these sources could be relied upon to find and prepare teachers, should a demand for such teachers arise. The one sent to hospital superintendents asked whether they would coöperate in finding among their graduates those qualified by education and temperament to teach; and the one to universities inquired whether they would, in case of a demand, offer pedagogical courses to fit such doctors and nurses to teach.

I was convinced that among the 100,000 trained nurses, and the 140,000 practising physicians in this country, there was no lack of good material; and equally convinced that the best potential teacher becomes a better actual teacher for having some pedagogical training.

Not one negative reply was received from a hospital superintendent; and among those that answered in the affirmative were the superintendents of the Post Graduate, the New York and the Presbyterian Hospital training schools, of New York City; the New England, of Boston; the Lakeside of Cleveland, the University Hospital of Philadelphia and St. Luke's of San Francisco. There is every indication that the hearty coöperation received in Rochester, from the superintendent of the Rochester General, would be the rule.

The second questionnaire, that to universities, brought affirmative replies, among others, from the George Washington University, of Washington, D. C.; and the state universities of Michigan, Wisconsin and Minnesota. Teachers' College of Columbia Uni-

versity, as you probably know, has now for several years offered a pedagogical course to trained nurses. The replies certainly showed that the question of teachers would prove no obstacle to the general adoption of the plan.

Nor would its adoption diminish in any way the service to the public of "Printers' Ink." Just as the fingers and ears of a blind man must substitute for sight, so printers' ink has, in this, had to fulfil its own function and that of the public schools as well. And, just as fingers and ears cannot be a perfect substitute for sight, no matter how perfectly they do their own work, so printers' ink cannot be a perfect substitute for oral instruction. "These things ought ye to have done and not to have left the others undone." The effect of taking such a demonstrated course of oral instruction is to increase one's avidity for health knowledge; it stimulates one's interest in all public health activities; consequently the printed word has not only a larger and more deeply interested, but also a more intelligently interested audience.

Incidentally, this opens an additional avenue through which state and local health departments can get their educational matter "across." While it is the function of departments of education to control the use of the schools, to engage and pay the teachers, and to supervise the teaching, in health matters as in other subjects, departments of health are in a position to induce school boards to offer health education. And no more effective method could be found than the coöp-

eration of the health department. This could be exercised in various ways: helping to prepare the lessons and find the teachers; preparing or furnishing charts and other demonstration material; and influencing people to attend the courses. The last-named is particularly essential, since school boards are not in a position to use school funds to advertise their activities. In Rochester not only the health officer endorsed the plan and coöperated with the Department of Education, but also the Woman's Educational and Industrial Union, the Chamber of Commerce, the Life Underwriters, Union Ministerial Association, Rochester Public Health Association, Rochester Medical Society, a federation of all the medical associations in the city, the Central Trades and Labor Council, Newswriters Club, Public Library Association, Rochester Motion Picture Managers Association, Rochester District Osteopathic Society, and others.

A *Live a Little Longer* General Committee was formed, with the one duty of bringing these health courses to the attention of the Rochester public, and keeping them before the public in such a way as to make people want to attend. This General Committee is built on the plan suggested by Professor Winslow for a Central Health Council, insofar, at least, as it is composed only of representatives from other organizations. The methods of this Committee are described in an appendix to a pamphlet, entitled "*Live A Little Longer—The Rochester Plan*," published by the Association of Life Insurance Pres-

idents, copies of which can be had, from them, upon request.

This "triple alliance" between the educational forces, the health forces and the public, is not only in theory but in practice feasible, efficient and effective. It tacitly admits the responsibility of the community to furnish health education for its citizens, recognizing that *we cannot limit the effects of ignorance to the ignorant*, but that the whole community profits from the education of the individual and suffers from his lack of knowledge. It furnishes a broad, well-balanced basis of health education, not being aimed at any particular disease, or against the diseases of any particular age, class or locality, although it can, when considered wise, be so aimed. It makes this information more interesting, and therefore more easily remembered, than is possible in any other than oral instruction, while the demonstrations and practice help the pupils to assimilate it. It keeps a record of who is taking advantage of this instruction, and keeps them in attendance throughout the whole course. It is designed to enlist and coördinate all existing local institutions and organizations that are in a position to interest even a fraction of the public in public health.

Unless it had been thought that this plan might possibly, with profit, be followed by other communities, it would probably not have been placed upon this program. If Rochester is correct in believing that a community owes it to itself to furnish health education for its citizens, then this responsibility rests upon every com-

munity. Therefore I suggest that there be added to the platform with which we began, these three planks:

First.—Every community owes it to itself to adopt an efficient plan of health education;

Second.—The *Live a Little Longer* plan is an efficient system;

Third.—Therefore every community owes it to itself to adopt this, or some equally efficient system.



NEW METHOD OF MAKING ANTI-HOG-CHOLERA SERUM.

A new method of preparing anti-hog-cholera serum, which permits the economical production of a clear sterilized product, has just been described in the *Journal of Agricultural Research* of the U. S. Department of Agriculture. The advantage claimed for the new method is that it makes possible the production of an anti-hog-cholera serum which can be quickly sterilized by heat to a point that will absolutely kill any germs of foot-and-mouth disease and so yield a serum that is absolutely safe even if taken from a hog which might harbor foot-and-mouth disease and yet give no indication of being infected.

The method, as described by its discoverers, Dr. Marion Dorset and R. R. Henley, of the Biochemic Division, Bureau of Animal Industry, consists in adding a slight amount of an extract from ordinary white navy beans to the defibrinated hog-cholera-immune blood which has been the form of the serum used in the past. The addition of this bean extract causes the red cells of the blood to agglutinate and when the mixture is whirled on a centrifuge the red cells pack together and form a rather stiff jelly-like mass. It is then possible to pour off a clear serum, leaving behind the red cells which play no part in preventing hog cholera and which in fact simply tend to dilute the serum and render its sterilization by heat impracticable. To increase the yield of clear serum the discoverers added a small amount of ordinary salt and found that they obtained from 70 to 74 per cent. of clear serum. The clear serum thus obtained it was found could be heated for 30 minutes at a temperature of 60 degrees C. without changing its consistency or lessening in any way its effectiveness in preventing hog cholera. The heating to this point for this time is more than sufficient to kill any germs of foot-and-mouth disease which might accidentally be present. Practical tests with hogs show that probably all of the

antibodies useful in combating hog cholera were retained in the serum and the red cells extracted contained so few, if any, of these valuable bodies as to make the residue of red cells useless in preventing the disease.

Before the clear serum was developed, many attempts were made to sterilize by heat in a practicable way the ordinary defibrinated blood. It was found, however, that heating the old product up to 60 degrees C. resulted in more or less complete coagulation of the defibrinated blood and in the destruction of the serum so far as its commercial worth is concerned. It was found that the highest temperature that could be used was 50 degrees C. and it was necessary to keep the old serum at this temperature for 12 hours to make certain that the virus of foot-and-mouth disease was killed. Heating serum at a steady temperature over this long period in ordinary practice is difficult and too expensive.

Attempts also were made to make a clear serum by centrifugalizing. It was found, however, that while the centrifuge would separate to some extent the red cells, they were in such shape that it was difficult to separate the serum completely. An important quantity of antibodies were left behind in the red clot, and the resulting product was a cloudy rather than a clear serum. With this process, moreover, it was possible ordinarily to secure only about 50 per cent. of serum. Under the new method it is possible to secure as high as 74 per cent. of clear serum, which in actual test has proved to be fully potent. This clear serum, moreover, can be completely sterilized in 30 minutes, whereas the old serum had to be heated steadily for 12 hours.

The new form of serum, as far as the Department knows, is not yet being made or put on sale by the commercial serum laboratories. As this process was discovered by the federal government, any one in the United States is free to use it.

INOCULATION AGAINST TYPHOID IN MARYLAND.

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From the Bacteriological Laboratories of the State and City Boards of Health.

Read before the Laboratory Section of the American Public Health Association, Rochester, N. Y., September, 1915.

We can scarcely understand why certain sections of the lay mind still look with horror upon inoculation, in spite of the many proofs of its efficacy. This excellent paper, in which is discussed the attack-rate among inoculated persons, adds to the proof, if proof be needed, a convincing argument.

WE SHOULD be somewhat averse from again presenting a paper upon this subject were it not that we have recently been able to obtain statistics showing the attack-rate among persons who have been inoculated with anti-typhoid vaccine prepared and distributed by the state and city departments of health.

Since early in 1910 the two departments have given out 17,651 complete immunizing doses of antityphoid vaccine; this figure includes persons who have been immunized up to July of the present year. The following table will show in detail the general distribution of the vaccine.

TABLE 1.

Peninsula Hospital, Salisbury.....	20
St. Agnes Hospital, Baltimore.....	46
Western Maryland Hospital, Cumberland	4
Sydenham Hospital, Baltimore.....	20
Municipal Tuberculosis Hospital, Baltimore.....	10
Johns Hopkins Hospital, Baltimore....	400
St. Joseph's Hospital, Baltimore.....	110
Maryland General Hospital, Baltimore..	134
Union Protestant Infirmary, Baltimore..	88
Mercy Hospital, Baltimore.....	293
Franklin Square Hospital, Baltimore....	77
University Hospital, Baltimore.....	327

Hospital for Women of Maryland, Baltimore.....	9
Hebrew Hospital, Baltimore.....	100
Church Home and Infirmary, Baltimore..	176
Hahnemann Hospital, Baltimore.....	11
Allegheny County Home, Cumberland...	200
Crownsville State Hospital, Crownsville	200
Industrial Home for Colored Girls, Melvale.....	110
Maryland House of Correction, Jessups	850
Springfield State Hospital, Sykesville...	2,531
Spring Grove State Hospital, Catonsville	664
Bay View Hospital, Baltimore.....	957
Maryland Naval Militia.....	75
Maryland National Guard.....	495
United States Government Testing Station, Indian Head.....	700
W. Va. Paper Pulp Company, Luke....	1,300
Maryland Agricultural College, College Park.....	40
Westernport, Maryland.....	197
Indian Head, Maryland.....	30
Frostburg, Maryland.....	250
Crisfield, Maryland.....	125
Baltimore, Maryland.....	1,598
Citizens of towns and rural districts....	5,504
Total.....	17,651

From the above table we find that we have inoculated 1,825 physicians, nurses and students connected with various hospitals; 5,512 inmates of, and attendants at, different institutions; 570 members of the Maryland

National Guard and Maryland Naval Militia; 2,000 employees of industrial plants, and 7,744 of the general population.

Of the 1,825 persons included in the first group, 1,732 have been immunized for a period of from one to five years; one of these, a nurse in a hospital in one of the counties of Maryland, developed enteric fever within one year after inoculation; this gives an attack-rate of 5.7 for vaccinated physicians, nurses and students living in these hospitals. In a former article* the authors showed that the typhoid morbidity for this group in six Baltimore hospitals for the five years preceding the adoption of antityphoid vaccination was about 500 per 10,000. This remarkable reduction in the attack-rate needs no comment.

Of the second group, 5,055 have been immunized for from one to five years. Three of these have since developed typhoid fever; one within a period of one year, another after twenty-one months, and the third after thirty-nine months. This gives an attack-rate of 5.8 per 10,000 for the vaccinated inmates of these institutions. The typhoid morbidity for these institutions as a whole had ranged from 50 to 200 per 10,000 a year prior to the adoption of prophylactic inoculation. It will be noted that the third case was attacked thirty-nine months after immunization. This man was inoculated in June, 1911, with three doses of vaccine containing 125,000,000, 250,000,000 and 500,000,000 dead organisms per cubic centimeter respectively, small doses as

compared with those used at present. While this case was rather severe, it was of short duration, as the fever subsided to normal on the nineteenth day.

Cases 1 and 2 occurred in an institution with about 1,200 inmates, in which, previous to the introduction of prophylactic immunization, the attack-rate was 100 to 200 per 10,000 a year. In the four years since immunization has been adopted, there have been five cases of typhoid fever in the institution; the two just cited, two in individuals who gave a history of having previously had typhoid, and who, therefore, were not immunized, and one in an attendant who refused to be vaccinated. These three latter cases indicate that the source or sources of the previous infections were still present after preventive inoculation had been introduced. In another institution, an insane asylum, there had been ten cases of enteric fever in a total population of 410 immediately before antityphoid vaccination was started, while in another, a penal institution, twenty of the 400 prisoners were suffering from typhoid fever at the time prophylactic inoculations were begun. In both of these epidemics no new cases developed after the use of the vaccine.

We have been unable to collect complete reports concerning the inoculation of the Maryland National Guard and the Maryland Naval Militia. However, from 2,000 to 3,000 men have submitted to antityphoid vaccination, of which number 570 were inoculated with vaccine prepared by the state or the city department of health. All of these men have been inoculated for a period of from one to

* Hachtel and Stoner, *Jour. Amer. Med. Assoc.*, 1912, LIX, p. 1364.

five years, and none have since developed enteric fever. Before the inoculation of the state troops was started, almost every year cases of typhoid occurred in the regiments after returning from camp, while the year immediately preceding the beginning of immunization there was an epidemic among the men of the different regiments.

Of the 9,744 persons included in groups four and five, 1,598, representing citizens of Baltimore, have to be subtracted, since we have been unable to obtain any information concerning these. Of the remaining 8,146, 7,733 have been inoculated from one to five years. Of this number, six developed enteric fever, giving an attack-rate of 7.75 per 10,000 among the inoculated. One of these became infected within four months after immunization, two within seven months, one within eight months, and two after an unknown period. All six of these people lived in a town in which, at the time, enteric fever was epidemic, and in which about 1,500 people had been inoculated with vaccine from the two departments.

In the above six cases we have included one which ran a mild course of one week's duration, and which the physician in charge did not feel sure was an attack of typhoid fever. In addition to these a case of typhoid fever occurred so soon after the completion of the inoculations that the physician administering the vaccine feels certain that the child was developing the disease during the time he was vaccinating him. We have also the report of an attack of enteric fever in a girl who had received but two doses of the vaccine.

In the same town in which the six cases lived who developed enteric fever after immunization with the department's vaccine, two other persons who had been injected with vaccine prepared, in the one case, in a well known biological laboratory, and in the other at the laboratory of the Medical Service of the army, contracted the disease. We have not included these in computing the attack-rate among immunized persons, since we have no idea of the number of citizens who have been immunized with other vaccine than that prepared at the joint laboratories of the state and city health departments.

The reports from various physicians throughout the state are very similar in character, in that families in which there were one or more cases of typhoid were immunized immediately and that in most instances no infection occurred among the inoculated. In one family in which three children were suffering from enteric fever, four other children and the parents were vaccinated, but one of the children developed the disease before the second dose of vaccine was given. This child was evidently in the incubation stage of the disease at the time the first dose of vaccine was administered. In another family of nine members, eight received the vaccine, but one who was not immunized developed typhoid and died. In the town of Frostburg, Md., a certain section had been showing a gradually increasing typhoid attack-rate each year. In 1912, 250 residents of this section were immunized, and up to the present time—over three years—there has been but one case in

this portion of the town, and that occurred in a man who had refused to be immunized. It must be noted that there has been no improvement in the sanitary condition of that section of Frostburg.

Over 500 employees at the United States Government Testing Station at Indian Head, Maryland, and civilians in the vicinity have been vaccinated and no cases of typhoid fever have developed within one year. Doctor Kress, the physician on duty at the station, states that "in the past the place has been a veritable hot-bed of typhoid fever." There has been no marked improvement in sanitary conditions since the inoculations were made.

From the above we see that 14,795 residents of the state of Maryland have been inoculated from one to five years with typhoid vaccine distributed by either the state or city boards of health and but ten of these have since had enteric fever, which gives an attack rate of 6.75 per 10,000 persons. This morbidity among the inoculated is higher than that reported by Russell* for the army, which for the five years 1909-1913 was about 2.0 per 10,000, but this is quite natural since, in the first place, the number of immunized citizens is smaller than the number of immunized soldiers, in the second, Maryland's attack-rate is high, in the third, the figures on which we base our calculations include six persons residing in a town whose water-supply was highly polluted, and in which the infection was not only very widespread

but also very virulent, and in the fourth place, the greater number of our cases are included in Group I, members of families in which the disease is present and individuals exposed to epidemics, in all of which the chances of infection are much greater than in the army.

In contrast to the aforementioned morbidity among the immunized, the attack-rate for the state of Maryland for a similar period (5 years) was 33.30 per 10,000.† The attack-rate for the whole registration area of the United States for 1912 was 16.5 per 10,000.

In summarizing we call attention to the following points: First, to the striking difference in the typhoid attack-rate among immunized nurses, physicians and students residing in hospitals and that for the same class before immunization; that is, it formerly was 87.7 times as great as it is at this time. Secondly, to the fact that enteric fever was from 8.4 to 33.9 times as prevalent in institutions before, as it has been since inoculation. Thirdly, to the difference between the attack-rate for the state (33.30 per 10,000) and that for the inoculated inhabitants (6.75 per 10,000).

For much of the statistical data we are indebted to Dr. R. H. Riley, Deputy State Health Officer of Maryland, to whom we extend our heartiest appreciation for his assistance. We are also indebted to Dr. Kenneth B. Jones, who was resident superintendent of one of the institutions at the time, for some of the information.

* Russell, *Jour. Amer. Med. Assoc.*, *Jour. Amer. Med. Assoc.*, 1914, LXII, p. 1371.

† As the report of cases of typhoid fever in Maryland is not complete, the figures are estimated from the reported deaths on the basis of a 10 per cent. fatality.

ONE YEAR'S EXPERIENCE WITH THE NEW MODEL VITAL STATISTICS LAW IN SOUTH CAROLINA.

JAMES A. HAYNE, M. D.,
Secretary South Carolina State Board of Health.

Read before the Vital Statistics Section, American Public Health Association, Rochester, N. Y.,
September 9, 1915.

MR. PRESIDENT and Gentlemen of this Section: I feel that I am a very tyro, and also presumptive in coming before this body of men experienced as they are in the obtaining of vital statistics, and interpreting the data obtained from such records. My only excuse is, that I was asked to do so, and that the title of the paper was furnished to me. Strictly speaking, we have had only eight months of vital statistics in South Carolina for, although the Model Law was passed in March, 1914, it was not signed by Gov. Coleman L. Blease until September, 1914.

The original bill as passed by the legislature was adopted by Dr. Cressy L. Wilbur, who took much interest in its passage and came to Columbia while the legislature was in session and also called on the Governor and urged the passage of the bill. The Act reads as follows:

An Act To Provide For The Registration Of All Births And Deaths In The State Of South Carolina. (Passed by the General Assembly, March, 1914.) (Signed by the Governor, September 1, 1914.)

SECTION 1. Be it enacted by the General Assembly of the State of South Carolina, that the State Board of Health shall establish a Bureau of

Vital Statistics, and provide an adequate system for the registration of births and deaths, by formulating, promulgating and enforcing rules and regulations prescribing the method and form of making such registration.

SECTION 2. That the Secretary of the State Board of Health shall be the State Registrar of Vital Statistics, and it shall be his duty to carry into effect the rules, regulations and orders of the State Board of Health. The Board shall provide suitable apartments, properly equipped with fire proof vaults and filing cases, for the permanent preservation of all official records.

SECTION 3. That for the purpose of the Act, the State Registrar shall divide the State into Registration Districts, defining and designating the boundaries thereof, and appointing Local Registrars in each district.

SECTION 4. That each Local Registrar shall be paid the sum of twenty-five cents for each birth certificate and each death certificate properly and completely made out and registered with him, correctly recorded and properly returned by him to the State Registrar, as required by the rules and regulations. And in case no births or no deaths were registered during any month, the Local Registrar shall be

entitled to be paid the sum of twenty-five cents for each report to that effect, but only if promptly made in accordance with the rules and regulations. All accounts payable to a Registrar under the provisions of this section shall be paid by the Treasurer of the County in which the Registration district is located, upon certification by the State Registrar. And the State Registrar shall annually certify to the Treasurers of the several Counties the number of births and deaths properly registered, with the names of the Local Registrars, and the amount due each at the rates fixed herein.

SECTION 5. That the State Registrar shall, upon request, furnish any applicant a certified copy of the record of any birth or death registered under the provisions of this Act, for the making and *certification* of which he shall be entitled to a fee of fifty cents, to be paid by the applicant. And any such copy of the record of a birth or death, when properly certified by the State Registrar to be a true copy thereof, shall be *prima facie* evidence in all Courts and places of the facts therein stated. For any search of the files and records when no certified copy is made, the State Registrar shall be entitled to a fee of fifty cents for each hour or fractional part of an hour of time of search, to be paid by the applicant. And the State Registrar shall keep a true and correct account of all fees by him received under these provisions, and turn the same over to the State Treasurer each month.

SECTION 6. That any person, firm or corporation who shall violate any

rule, regulation or order of the State Board of Health, relative to recording, reporting or filing information for the Bureau of Vital Statistics or who shall wilfully neglect or refuse to perform any necessary or reasonable duties imposed upon them by said orders, or who shall furnish false information for the purpose of making incorrect records for said Bureau, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined not less than five dollars, nor more than one hundred dollars, or be imprisoned in the County jail not exceeding thirty days, or suffer both fine and punishment in the discretion of the Court.

SECTION 7. That all Laws and parts of Laws in conflict with the provisions of this Act, are hereby repealed; and no system for the registration of births and deaths shall be continued or maintained in any of the several municipalities of this State other than the one provided for and established by this Act.

SECTION 8. That this Act shall go into effect on July the first, nineteen hundred and fourteen.

Approved the first day of September, A. D. 1914.

(Signed)

COLEMAN LIVINGSTON BLEASE,

Governor.

It will be seen that the Act contains only eight sections and that the details are left to be worked out by the Executive Committee of the State Board of Health. This was the salvation of the bill, for where a busy legislature has to take up item by item a long bill such as the Model Bill as originally

drafted cannot be passed, for some member of the legislature will object and then the bill will be held up.

Year after year, since 1878, have we tried to have an adequate vital statistics law passed, and failed, simply because the legislature was luke-warm and did not care whether the law passed or not, and the bill itself was so long that it was side-tracked.

The Model Concise Law as enacted by South Carolina is recommended to other states. It can be passed, will meet with but little opposition and is adequate, covering all necessary points. The Regulations adopted by the Board were copied with but slight modification from the original Model Vital Statistics Law. After the passage of the law and its signature by the Governor, the next question that confronted us was the fact that the Act carried no appropriation. Fortunately, there was an extraordinary session of the legislature held in December, 1914, and we obtained the sum of fifteen hundred dollars with which to have blanks, etc., printed so that we could actually put the law in operation January 1, 1915. We had to send to each physician blanks for the reporting of births and deaths; to each undertaker, death certificates; and then came our most difficult task, viz., the appointment of local registrars. We thought we had solved the difficulty by appointing all the magistrates, except in the larger towns, but when the attorney-general ruled that magistrates were ineligible on account of a Constitutional provision that no man could hold two offices, we were again at sea. We then wrote to the clerks

of court of each county and asked them to name a man in each township. In this way we secured many.

South Carolina is divided into counties and townships. Some counties have but a few large townships while other counties have as large as fifteen. In the large townships the local registrars are directed to appoint sub-registrars, who will report to them and be paid a fee by them. Their names must be furnished, however, to the state registrar, who will supply these sub-registrars with necessary blanks. In incorporated towns we usually have the secretary of the local board as the registrar. Fortunately the appointing power is left absolutely in the hands of the state registrar, so that appointment and removal is accomplished. A book of instructions is sent to each local registrar, to each practising physician and to each undertaker in the state, so that those most interested in the law are thoroughly informed as to its provisions, also a list of registrars is sent to each registrar, physician and undertaker, so that they know to whom to report births and deaths.

WHAT CLASS OF CITIZENS MAKE THE BEST REGISTRARS?

This question we have too little experience to answer, but we believe from what we have observed that they must be good mixers, not contentious, preferably married, so that their wives or daughters can act as deputy registrars. The pay is so small that only very patriotic citizens will stick after appointment. Many will apply, simply because to the average American

citizen a job, and especially a government job, is always sought. The state registrar must by personal letters, frequently sent, make these local registrars feel the importance of their positions. He must praise them often and scold them as little as possible. The iron hand of the law must be well covered with the velvet of persuasion. Friendly rivalry must be excited between counties so that each will strive to be more nearly correct in their reports each month. Each registrar in a township must be informed monthly of the percentage of deaths he has reported, so that he will have some idea whether all are being reported to him. The use of colored maps, such as I will pass around, help to arouse interest, when shown at talks to the county medical societies, and thus the doctors become interested.

Lack of coöperation on the part of physicians is one of the great stumbling blocks. Doctors are busy men, usually autocratic; give directions to others, and are accustomed to obedience. They call no man master, especially the country physician, and they cannot be driven. However, they can be persuaded and I usually quote Doctor Charllé to them as follows: "Public hygiene derived its birth from, and depends for its future progress on vital statistics, and every argument which favors the establishment of boards of health is an argument for vital statistics. For while a board of health without them is as helpless as a man without eyes to guide him, so without vital statistics the public is destitute of the only valid test of the value of a board of health.

If a human being is much more valuable to the state than is a bale of cotton, then statistics of the human crop would prove much more valuable than statistics of the cotton crop; and yet every newspaper can and does furnish statistics of the cotton crop, such as no man can now anywhere procure as to our human crop."

Vital statistics furnish unerring lessons as to health, prosperity and morals of the people; they teach the influence of marriage on illegitimacy and morality, the fecundity of a whole people and of the races thereof; the vital force of children; the duration of life with its expectations and values for all ages and races; the influence of meteorology, occupation, locality, in generating disease and improving health, and thereby the removal of unfavorable conditions, always found, where least expected, and the approach of morbidic storms, by ignorance of which negligent cities, and even nations have been destroyed.

The only foundation of life insurance, vital statistics, alike serve to guide the resident and the emigrant, the capitalist and the laborer, the politician and the statesman, the moralist and the scientist.

Ignored and disparaged by the average American legislator, vital statistics have been advocated and supported by Napoleon and Thiers, by Bismarck and Cavour, by Gladstone and Disraeli; and their establishment has become a test of the degree of civilization reached by a people and their rulers. Doctors who have proven their patriotism in war as well as in peace will not shrink from this small en-

croachment on their time, when their attention is properly drawn to the valuable results to the material prosperity of the state, which a proper registration of births and deaths would produce. I have found the undertakers easy to approach and willing to aid. Some of them have proved stiff-necked, but an appeal to the nearest magistrate soon brings them to a realizing sense of the situation. For undertakers are not as popular with the general public as are doctors, and juries are not at all hard to persuade as to their guilt, but a jury will not usually convict the family physician of a neighborhood, for fear, perhaps, that when he gets a chance, he may make it warm for them.

THE RELATION OF THE FEDERAL GOVERNMENT TO VITAL STATISTICS.

I may be accused of being a backslider from the good old Democratic principles of states rights and local self-government, but I firmly believe that vital statistics, and the information obtained by them, belong to the United States government, and that this government should work out a universal plan for obtaining them, and, moreover, the most important idea of my belief is that all expenses necessary to obtain vital statistics should be borne by the United States government. There seems to be no criterion by which the government now judges whether a state is obtaining a true record of its births and deaths or not. States admitted to Registration Area show frequently a lower percentage of deaths per thousand than those refused

admittance. Virginia was admitted on 14.2 per thousand, and South Carolina not admitted has a percentage of 15.7 per thousand. Now Virginia may have as low a death-rate as indicated by 14.2 but we have serious doubts. We believe 15.7 per cent. per thousand to be about 85 per cent. of South Carolina's actual death-rate, and we believe 25.2 to be about 80 per cent. of the birth-rate, and we are going to keep hammering until we are successful in getting at least 95 per cent. of both. I append some figures obtained (Annual death-rate for the State of South Carolina). I want to say that all these births and deaths are bound in volumes, numbered and card indexed. We are proud to say that we believe that the cost in our state of this work has been less than in any other state. We have spent for eight months' work out of an appropriation of \$5,000, \$3,026. Our office force consists of the following personnel:

	Salary.
J. A. Hayne, State Registrar	None
C. W. Miller, Chief Clerk	\$1,200.00
File Clerk	720.00
Clerk half time	300.00
Stenographer	600.00
Typewriter	300.00

Total cost per month for salaries, \$285.00, and with this expenditure we have received, tabulated and bound in the first seven months 14,920 deaths and 25,337 births, and I can say without conceit that I am proud of the record and do not believe it has ever been equaled.

ANNUAL DEATH RATE FOR THE STATE
OF SOUTH CAROLINA.Based upon Reports for Six Months, January-
June, 1915.

Disease.	No. deaths.	Rate per 100,000.
Diseases of the circulation..	1,274	158.4
Tuberculosis pulmonalis....	1,138	141.5
Pneumonia, lobar.....	1,099	136.0
Diseases of the kidneys.....	815	101.3
Pellagra.....	682	84.8
Intestinal diseases.....	528	65.6
Dysentery.....	289	35.9
Cancer.....	269	33.4
Pneumonia, broncho.....	216	26.8
Typhoid fever.....	143	17.7
Whooping-cough.....	127	15.7
Malaria.....	105	13.0
Syphilis.....	73	9.0
Meningitis.....	46	5.7
Cerebro-spinal meningitis....	37	4.6
Tuberculosis of the bowels....	29	3.5
Tuberculosis, peritoneal....	25	3.1
Diphtheria.....	22	2.7
Pleurisy.....	21	2.6
Tetanus.....	15	1.8
Tubercular meningitis.....	14	1.7
Pneumonia, hypostatic.....	14	1.7
Tubercular laryngitis.....	6	.7
Typhoid pneumonia.....	6	.7
Tuberculosis of the joints....	5	.6
Erysipelas.....	5	.6
Dysentery, amœbic.....	4	.5
Scarlet fever.....	3	.4
Typhoid dysentery.....	3	.4
Measles.....	2	.2
Smallpox.....	2	.2
Scurvy.....	1	.1

Deaths for six months ending June 30, 1915.....	12,633
Births for six months ending June 30, 1915.....	21,892
Death-rate per 1,000 for year, based on reports for six months, Jan.-June, 1915.....	15.7
Birth-rate per 1,000 for year based on re- ports for six months, Jan.-June, 1915	27.2

	No.	Rate.
July Deaths.....	2,287	16.7
July Births.....	3,445	25.2

Respectfully submitted,

C. WILSON MILLER,

Chief Clerk Vital Statistics.

WHITE, MALE.

Under 1 year.....	509
1 to 5.....	276
5 to 10.....	42
10 to 20.....	103
20 to 30.....	160
30 to 40.....	171
40 to 50.....	181
50 to 60.....	251
60 to 70.....	303
70 to 80.....	286
Over 80.....	124
Unknown.....	19
	2,425

WHITE, FEMALE.

Under 1 year.....	387
1 to 5.....	204
5 to 10.....	48
10 to 20.....	106
20 to 30.....	206
30 to 40.....	236
40 to 50.....	172
50 to 60.....	197
60 to 70.....	269
70 to 80.....	291
Over 80.....	187
Unknown.....	23
	2,326

NEGRO, MALE.

Under 1 year.....	912
1 to 5.....	355
5 to 10.....	121
10 to 20.....	265
20 to 30.....	406
30 to 40.....	299
40 to 50.....	301
50 to 60.....	278
60 to 70.....	327
70 to 80.....	221
Over 80.....	136
Unknown.....	71
	3,692

NEGRO, FEMALE.			
Under 1 year	813	Over 80	149
1 to 5	260	Unknown	55
5 to 10	112		4,005
10 to 20	354	INDIAN, MALE.	
20 to 30	626	Under 1 year	1
30 to 40	442	10 to 20	1
40 to 50	343	40 to 50	1
50 to 60	266		3
60 to 70	285	INDIAN, FEMALE.	
70 to 80	200	1 to 5	1

SCARLET FEVER.

L. I. Dublin, statistician of the Metropolitan Life Insurance Co., New York, reports in the *Journal A. M. A.*, May 27, 1916, the results of his investigation of 1,153 cases of scarlet fever with special reference to their sequelæ. The plan followed was to trace the condition of the survivors as far as possible through an interval of four or five years after recovery and to note especially the mortality from causes that might be considered as sequelæ of the primary disease. In case of typhoid fever he was able to show that in a series of 1,428 patients who had survived the attack of that disease the mortality during the three following years was twice as great as might have been expected from the age, sex and color of the group. This high mortality resulted from an increase in the number of deaths from tuberculosis and organic heart disease. In the present study the records of the Visiting Nurse Service of the Metropolitan Life Insurance Co. furnished the material wanted. Nearly 82 per cent. of all the cases were among children between 2 and 10. The greatest disposition to the disease is between the age of 3 to 7 years, and over 55 per cent. of the total were within these five years of life. The period from 11 to 15 presents an appreciable number of cases, but after this period the cases are few and far between. The figures in this respect agree with those found elsewhere. There were 90 deaths that occurred in the 1,153 cases and the highest mortality occurred nearest the second birthday. The ninety deaths showed complications in sixty-two cases. There were represented during the entire period subsequent to the attack, 3,583 years of life. That is, 1,063 persons were under observation for an average of 3.4 years. The expected number of deaths for this group of survivors was then calculated and the mortality rate actually experienced by the company for corresponding age, sex and color during

the years covered by the study was used as a standard. According to this measure we had a right to expect 18.6 deaths, but the percentage was only 18. Instead of showing a higher mortality, as in the typhoid fever study, the actual mortality was 97 per cent. of the expectation. Three of the eighteen deaths showed a record of endocarditis on the death certificate which may reflect the impairment resulting from the scarlet fever. There were five deaths from respiratory diseases and four from tuberculosis. The remainder were scattered among a number of causes which have no particular significance. Oddly enough, there were no deaths from kidney diseases, and it would seem that impairments of the kidneys which are so common in scarlet fever are either severe enough to cause immediate death, or that in the survivors the injurious effect is not sufficiently great to kill within the next five years. It is possible that there may ultimately be an increase in the expected number of deaths from kidney diseases and he hopes to investigate this matter of the future. While the sequelæ do not appear to be an appreciable factor in the mortality of surviving children, the disease itself is an appreciable factor in children's mortality. The disease has not decreased in frequency of late years, as is the case of some other infective diseases. The most interesting facts indicated in the table of the mortality experience is the markedly lower mortality of the colored race. The death rate for colored children is about one fourth that of the whites. The seasonal incidence of scarlet fever is last noticed. From January the frequency of the disease rises rapidly to a maximum in May, and then there is a rapid drop to September, which gives a minimum. For the remainder of the year there is a rise of the curve, as shown in the chart given in the original paper.

AN ANALYSIS OF APPENDICITIS STATISTICS.

KNUD STOUMANN,

The Prudential Insurance Company of America.

Read before the Vital Statistics Section of the American Public Health Association, Rochester, N. Y.,
September 9, 1915.

WHEN Professor Reginald H. Fitz of Harvard in 1886 wrote his classic paper on "Perforating Inflammation of the Vermiform Appendix," the word *appendicitis* was used for the first time. The establishment by McBurney three years later of "McBurney's point," midway between the anterior superior spine of the ilium and the umbilicus, was probably the most important event in the development of the diagnosis of appendicitis. Although surgeons in the two previous centuries more and more frequently demonstrated perforative abscesses in the appendix vermiformis, it was not until the two last decades of the nineteenth century that this disease was thoroughly explored. The intense interest caused by these discoveries is best seen in a paper by Dr. George M. Edebohls in 1899 in which he states that he had read twenty-five hundred articles and books on appendicitis. No other abdominal operations are now so common as removal of or incision in the appendix vermiformis. In spite of this, however, no one has as yet to any great extent utilized the official mortality statistics of the several countries to further their own investigations. The explanation probably is that the general knowledge of this disease is so new that a complete

registration of the deaths caused by appendicitis has not as yet, or only recently, been attained.

The registration report of Massachusetts gave the deaths from appendicitis for the first time in 1896; the Registrar-General of England and Wales introduced appendicitis as a separate group in 1901. In Norway registration of deaths from appendicitis began in 1896; in the German Empire not before 1906. Naturally, it requires several years before a new classification takes full effect, and only gradually will deaths from appendicitis be transferred to this group; many deaths, in several countries, even now, being classified under other groups, especially under peritonitis. It is nowhere possible to use the data for much more than the last ten years, and even these must be used with caution. But in spite of the gradual accumulation, certain useful facts may be established by careful examination of the available data.

The following table gives the geographical incidence of appendicitis and peritonitis throughout the world. The most evident fact in this table is that the lower the death-rates from appendicitis the higher the rates from peritonitis. Bearing in mind that the majority of fatal cases of appendicitis terminate in peritonitis this should not

surprise us. Given on the death certificate two or more causes of death, it depends on the registrar whether the final or originating cause is to be considered the fact to be registered. Peritonitis is less and less accepted, without explanation, by registration officials as a cause of death. Of 79

MORTALITY FROM APPENDICITIS AND PERITONITIS (NOT PUERPERAL) IN THE PRINCIPAL COUNTRIES.

Country.	Period.	Death-rate per 1,000,000 population.	
		Appendicitis.	Peritonitis.
Switzerland.....	1907-1911	113.3	41.3
United States*.....	1908-1912	107.5	42.1
Ontario.....	1908-1912	98.1	66.2
New Zealand.....	1908-1912	84.6	61.6
Sweden.....	1911	81.8	†
Scotland.....	1908-1912	80.9	42.6
Australia.....	1908-1912	73.7	42.4
England and Wales.....	1908-1912	66.3	16.5
Norway.....	1908-1912	65.6	83.7
German Empire.....	1908-1912	60.3	†
Japan.....	1909-1911	38.4	368.7
Ireland.....	1908-1912	36.7	23.4
Cuba.....	1908-1912	35.3	42.8
Uruguay.....	1908-1912	28.6	98.9
Holland.....	1908-1912	24.9	85.4
Chile.....	1911-1912	19.7	84.9
Italy.....	1908-1912	19.5	101.5
Straits Settlements.....	1909-1913	10.6	123.8

* Registration states.

† No record.

cases in the United States registration area in 1911 in which the assignment was changed from peritonitis, 18 were added to appendicitis. Of 135 cases in Ireland in 1906, 22 were added to appendicitis. At the same time these inquiries must tend to make the physicians more careful and precise in stating the cause of death. Naturally,

where the registration methods are so widely different as in the eighteen countries included in the above table, we must expect wide variations in the mortality on this account. Excluding Sweden, Germany and Japan, the correlation between the two columns of the above table is -0.5802 ± 0.1148 . Considering the many other influences at work this must be considered indicative of a real inverse correlation. This fact, however, does not entirely explain the differences in the several countries. There is no doubt that the mortality from appendicitis is higher in this country than in England and Wales; higher in Switzerland than in Holland; but the reasons for these differences are not at all evident. There seems to be a certain tendency to higher rates where mountains or long distances make access to the hospitals difficult. Switzerland, United States, Ontario, New Zealand, Sweden and Scotland have high rates; Norway also, considering the high peritonitis rate; while England, Holland, Ireland and the German Empire have rather low death-rates from appendicitis.

A survey of the mortality from appendicitis in the cities of this country emphasizes the statement just made. The following table shows clearly that the highest mortality is in the thinly populated or mountainous states, as, for example, in Utah, Montana, Colorado, Minnesota and Vermont. The densely populated eastern states, with their better transit facilities, have lower rates, as New Jersey, Pennsylvania, Connecticut and Maryland. This table shows no inverse correlation

between appendicitis and peritonitis, as does the previous table. There is no correlation at all (0.0165 ± 0.1367); nor could any be expected, as the several states, at a given time, were under the same system of registration. We shall see later, however, that other influences are also at work.

MORTALITY FROM APPENDICITIS AND PERITONITIS IN THE UNITED STATES.

State.	Period.	Death-rate per 1,000,000 population.	
		Appendicitis.	Peritonitis.
Utah.....	1910-1913	185.9	45.5
Montana.....	1910-1913	179.8	56.4
Colorado.....	1909-1913	159.6	29.6
Minnesota.....	1910-1913	155.0	20.1
Vermont.....	1909-1913	148.3	51.5
Wisconsin.....	1909-1913	126.6	39.4
Michigan.....	1909-1913	123.5	61.9
California.....	1909-1913	120.5	33.2
Washington.....	1909-1913	119.7	13.5
Missouri.....	1911-1913	118.8	34.6
New York.....	1909-1913	118.2	24.5
Maine.....	1909-1913	117.3	55.9
Massachusetts.....	1909-1913	108.8	39.3
Rhode Island.....	1909-1913	107.8	21.6
Indiana.....	1909-1913	105.7	34.8
District of Columbia.....	1909-1913	104.9	55.1
New Hampshire.....	1909-1913	98.4	91.9
Ohio.....	1909-1913	98.2	37.0
New Jersey.....	1909-1913	93.1	18.3
Pennsylvania.....	1909-1913	89.9	36.8
Connecticut.....	1909-1913	86.5	34.7
Maryland.....	1909-1913	83.2	28.7
Kentucky.....	1911-1913	70.3	53.4
Virginia.....	1913	64.3	39.0

The Apparent Increase of Appendicitis—The most conspicuous feature of appendicitis statistics is the apparent increase of the death-rate in most countries. Many writers have been misled by this to assume that appendicitis was really increasing rapidly; some have even thought they had ob-

served an increasing virulence in the disease. This cannot be so, however. If there is any increase in the appendicitis mortality it is but slight, the probability being that there is no increase at all. The apparent increase is evidently due to better diagnosis and new methods of tabulation. Deaths have been transferred to appendicitis in large numbers from simple peritonitis, and also from other groups, such as intestinal obstruction, intestinal inflammation, enteritis, and other digestive diseases. Considering how recently the registration of appendicitis deaths was begun, this is not surprising but rather to be expected. In this connection it may also be noted that the increase seems to be falling off in most countries. The mortality from appendicitis in England and Wales increased during the period 1901 to 1904, from 38 to 56, or 18 per million of population, from 1910 to 1913 it increased from 66 to 68, or only 2 per million. In Switzerland the death-rate from appendicitis increased from 90 to 116 per million during the period from 1901 to 1903; attained its maximum of 125 in 1906, and then decreased to 106 in 1910. In New York State the death-rate from appendicitis was 120 per million in 1904, which figure was only surpassed in 1913 when the rate was 122. In most European countries the mortality from appendicitis attained a maximum in 1911, which has not been equalled in the last two years.

When comparing the same group of countries or states in two different periods of time, a large increase of appendicitis generally corresponds to a

large decrease of peritonitis, as shown in the following tables:

MOVEMENT OF THE MORTALITY FROM APPENDICITIS AND PERITONITIS IN NINE COUNTRIES.

(Rates per 1,000,000 Population.)

	Appendicitis.			Peritonitis.		
	1903-06.	1909-12.	Increase.	1903-06.	1909-12.	Increase.
Norway.....	52	68	16	97	79	-18
Ireland.....	23	38	15	58	23	-35
England and Wales.....	57	68	11	27	12	-15
United States*.....	102	111	9	87	36	-51
Cuba.....	29	35	6	47	44	-3
New Zealand.....	82	84	2	77	61	-16
Holland.....	25	25	0	96	84	-12
Switzerland.....	114	114	0	47	39	-8
Uruguay.....	34	28	-6	85	99	14

* Ten original registration states.

MOVEMENT OF THE MORTALITY FROM APPENDICITIS AND PERITONITIS IN TEN STATES OF THE UNITED STATES.

(Rates per 1,000,000 Population.)

	Appendicitis.			Peritonitis.		
	1904-08.	1909-13.	Increase.	1904-08.	1909-13.	Increase.
Vermont.....	114	148	34	124	51	-73
Maine.....	91	117	26	94	56	-38
Indiana.....	80	106	26	96	35	-61
New Jersey.....	81	93	12	60	18	-42
Massachusetts.....	100	109	9	78	39	-39
Michigan.....	119	123	4	118	62	-56
New York.....	114	118	4	59	25	-34
New Hampshire.....	102	98	-4	102	92	-10
Connecticut.....	94	86	-8	65	35	-30
Rhode Island.....	129	108	-21	32	22	-10

For the nine above-mentioned countries the coefficient of correlation for the increase of appendicitis and peri-

tonitis is -0.6533 ± 0.1280 ; for the ten original registration states of the United States, -0.8199 ± 0.0695 . The last coefficient is especially significant; that they are not higher is explained by the fact that deaths formerly classified under peritonitis have also been transferred to other causes than appendicitis; that this disease has also received deaths from other groups; and, finally, because there are, as we shall see later, independently of this fictitious increase, other and real movements in the appendicitis mortality.

We also get high inverse correlation when comparing the death-rates from appendicitis and peritonitis by single years in the same country. The coefficient of correlation for mortality from appendicitis and peritonitis in England and Wales from 1901 to 1913 is -0.9035 ± 0.0342 ; for Norway from 1899 to 1912 it is -0.8660 ± 0.0448 ; and for Holland, from 1903 to 1913, it is -0.6505 ± 0.1165 . That this is not mere coincidence is still more strongly brought out by an analysis of the age distribution of this mortality. The following table for England and Wales shows that the increase of appendicitis as well as the decrease of peritonitis has been most pronounced in early and late life, being far less marked in middle life.

Appendicitis and Age.—Appendicitis is generally considered a disease distinctly of early life, but this is not strictly true. The majority of deaths occur at the ages between five and thirty years, but we must not forget that at the more advanced ages far fewer persons are exposed to risk. If

MOVEMENT OF MORTALITY FROM APPENDICITIS
AND PERITONITIS, BY AGE, IN ENGLAND AND
WALES.

(Rates per 1,000,000 Population.)

Age, years.	Appendicitis.			Peritonitis.		
	1903-07.	1908-12.	Increase.	1903-07.	1908-12.	Increase.
Under 15.....	56	72	16	28	19	-9
15-24.....	76	78	2	15	8	-7
25-34.....	50	54	4	15	10	-5
35-44.....	44	49	5	18	13	-5
45-54.....	50	63	13	24	17	-7
55-64.....	57	72	15	43	24	-19
65 and over.....	56	75	19	86	56	-30

we calculate the specific death-rates from appendicitis by age, we will generally find a curve with two crests, one

SPECIFIC DEATH-RATES FROM APPENDICITIS BY
AGE AND SEX, IN ENGLAND AND WALES,
1903-07 AND 1908-12.

(Rates per 1,000,000 Population.)

Age, years.	Males.		Females.	
	1903-07.	1908-12.	1903-07.	1908-12.
Under 1.....	5.1	7.7	5.1	9.4
1.....	7.6	11.9	2.7	6.0
2.....	15.3	26.0	12.7	16.4
3.....	30.5	46.2	21.9	29.0
4.....	41.7	68.0	31.9	50.3
5-9.....	77.7	99.9	60.6	86.3
10-14.....	105.2	120.5	66.1	78.0
15-19.....	110.9	104.4	62.4	68.4
20-24.....	83.3	87.6	50.0	52.5
25-34.....	62.6	64.2	39.2	45.5
35-44.....	52.5	56.2	36.1	42.2
45-54.....	62.4	76.6	39.2	51.2
55-64.....	67.2	85.4	48.0	60.5
65-74.....	55.9	84.9	49.1	64.6
75-84.....	68.2	83.3	59.3	76.8
85 and over....	49.9	62.1	85.0	63.4
All ages.....	69.1	78.2	45.5	55.1

in early life and one in late life and a more or less pronounced depression between them. Except in the first few years of life, where the records are not very reliable and the diagnosis very difficult, the mortality from appendicitis varies less with age than most other causes do.

The above table shows the mortality from appendicitis by age and sex at different periods in England and Wales. All the four columns have the same principal character: the death-rates are very low at birth; attain their maximum at about ten years of age; decline again rapidly until about the age of forty, whereupon they rise toward another, but less pronounced, crest at about seventy. As our observations are naturally few for extreme old age, the true nature of the curve is more uncertain, but there is evidence of a new decline during this period. The observations for the period 1908-12 show considerably more regularity than the earlier period, especially in the higher ages, which again shows us that we have not until very recently had anything like a complete record of the deaths from appendicitis. If we examine the mortality curve for the last five years it is quite evident that we are here dealing with a compound of two curves, both skew, and in the first case with the mode nearer the beginning of life than the mean of the curve is, in the second case with the mode nearer the end of life. Bearing in mind that a crest in the mortality curve means that the body at that age has the least power of resistance against the said disease, we get a picture of two groups of causes attacking

the vermiform appendix, one aiming at the age of about ten, the other at the age of about seventy years. The mortality from appendicitis in middle life is a compound of these two. It may be of interest in this connection to note the distribution of the deaths from appendicitis under the age of one year. In England and Wales there was one death from appendicitis, from 1911 to 1913, under one month of age; seven deaths from one to three months; eleven from three to six months, and seven from six to twelve months. This would suggest a separate curve for infantile appendicitis, possibly reaching into ante-natal life. We know of at least one case (reported by A. Gloniger, of Lebanon, Pa.) in which inflammation of the appendix vermiformis was present at birth.

Our general knowledge of appendicitis confirms this statistical picture of the disease. In childhood and youth the acute form of appendicitis is prevalent; in later life we frequently meet with the subacute or chronic types of the disease. The acute appendicitis is again classified in simple or catarrhal, suppurative and gangrenous, with or without perforation. It would be a great help in the study of appendicitis if the disease were more fully described on the death certificate, instead of merely stating, appendicitis, diffuse peritonitis, as is generally the case. It is also known that the appendix vermiformis is undergoing a gradual change from birth to senility. In old age the organ is shorter and broader than in youth and is undergoing slow atrophy. In infancy and childhood intestinal worms are of etiological importance,

whereas fecal concretions are not found so frequently as in later life.

The double mortality curve is characteristic of appendicitis or the group of diseases classified under this title; we find it well defined in recent statistics for Holland and Prussia. In all cases the female rates are lower than the male rates throughout life. The depression of the mortality curve during middle life is less pronounced in the statistics of American states, and in the western states it has almost entirely disappeared, as the following table shows:

SPECIFIC DEATH-RATES FROM APPENDICITIS BY
AGE IN AMERICAN STATES, 1907-13.
(Rates per 1,000,000 Population.)

Age, years.	Massachusetts.	New York.	Pennsylvania.	California.	Colorado.
Under 1.....	18.2	23.8	15.0	21.0	24.9
1.....	34.4	21.7	18.0	19.4	27.5
2.....	46.4	47.5	21.2	28.4	25.6
3.....	58.1	57.9	27.3	68.6	58.9
4.....	71.4	84.8	39.3	72.1	60.1
5-9.....	122.0	114.3	77.8	99.7	123.9
10-19.....	137.7	136.7	121.7	135.6	187.6
20-29.....	98.6	114.6	99.0	129.2	175.1
30-39.....	102.6	116.7	94.1	132.9	161.5
40-49.....	100.7	113.2	96.2	134.6	186.5
50-59.....	115.2	150.9	99.6	124.6	164.9
60-69.....	128.8	136.7	85.1	105.9	134.4
70-79.....	105.1	123.4	92.4	117.9	209.9
80 and over....	79.4	111.7	95.9	81.8	291.1
All ages.....	105.9	116.1	90.6	119.6	155.7

The cardinal point to be considered in mortality statistics is the age question; certain ages will always favor certain pathologic developments or have a maximum exposure to certain dangers. When computing the specific death-rates by age and sex for each disease we get different curves, each

characterizing the exposure and the affinity of the body to the corresponding disease. The crude or standardized death-rate is not a sufficient indication of the significance of a disease, nor does it give us much information about the nature of the disease. If two age curves show much similarity there is probably a common factor in the origin or development. This might be of value in cases where the origin of the disease is yet obscure, as is, for instance, the case with appendicitis. Several bacteria have been found in the diseased appendix vermiformis, the most frequent being streptococcus pyogenes and bacillus coli communis. If we compare the age curve of appendicitis with those of other diseases we find it to have a very close resemblance to the age curve for rheumatic fever, as the following table shows:

SPECIFIC DEATH-RATES, BY AGE AND SEX, FROM
APPENDICITIS AND RHEUMATIC FEVER, IN
ENGLAND AND WALES, 1911-13.

(Rates per 1,000,000 Population.)

Age, years.	Appendicitis.		Rheumatic Fever.	
	Males.	Females.	Males.	Females.
Under 5.....	36	24	19	15
5-9.....	103	87	64	65
10-14.....	122	86	80	97
15-19.....	107	69	64	72
20-24.....	88	56	43	50
25-29.....	72	43	39	42
30-34.....	63	48	37	44
35-39.....	54	40	48	46
40-44.....	61	48	45	50
45-49.....	81	56	58	50
50-54.....	84	59	59	57
55-59.....	92	57	62	60
60-64.....	86	70	46	69
65-69.....	91	66	52	60
70-74.....	102	98	55	39
75 and over....	100	95	30	35

If we except the high ages, in which the observations are few and diagnosis is difficult and uncertain, there is almost perfect uniformity between the curves of the two diseases. Excluding the ages above seventy, the factor of correlation between the specific death-rates by age from appendicitis and rheumatic fever in England and Wales, 1911-1913, is 0.8800 ± 0.0404 for males, and 0.9058 ± 0.0322 for females. The etiologic relation of the two diseases has actually been under discussion since the middle of the nineteenth century without their connection being definitely determined. In later years streptococci have been frequently isolated in cases of rheumatic fever, and it is not unlikely that these bacteria are the missing link of connection between the two diseases. If so, they must be a factor of considerable importance in the development of both diseases.

If a disease shows deviation from its normal mortality, its age curve will tell us just where the change occurs and give us a clue to its cause, and if the change is only fictitious it will in many cases tell us so. A good general view is obtained by following the specific death-rates by age from year to year, as is done in the preceding table. The table is given for England and Wales from 1903 to 1913 only, the registration of appendicitis being quite incomplete in 1901 and 1902.

This table shows two different types of movement. For males there has been no increase, or only a slight increase, of the death-rates for the age groups from five to thirty-four years, but there have been two very marked

high points, evidently corresponding to some sort of epidemic, one in 1906 and one in 1911. After these high levels of the mortality there has immediately been a rapid decrease. The conclusion would be that there has been no general increase of appendicitis among males of young age, and that the registration has here been fairly complete during the last eleven years. On the other hand, appendicitis will in this period of life, at intervals, assume an epidemic character or it is possible that we are confronted with a distinct infectious disease of the appendix vermiformis, prevalent only in childhood and youth and rare in later life. These characteristic high points are less prominent or entirely absent in the ages above thirty-five years and under five years. Instead of this we have a very marked general increase from 1903 to 1913. If we combine the age groups of thirty-five years and over and correlate the rates to the male mortality rates from peritonitis, we get a correlation coefficient of -0.8718 ± 0.0485 . This inverse correlation is so high that there can be no doubt of the connection of the series of figures. We must regard this increase as due to a change in the classification of deaths. This movement is very marked in the ages under five, where the mortality has more than trebled during this period. For the females we have the same typical high points in 1906 and 1911, but pronounced only in the age groups of ten to fourteen and twenty to twenty-four; the high point of 1906 is also pronounced in the age group of fifteen to nineteen years. In the higher ages

we find a strong general increase, as for males.

Appendicitis and Diarrhea.—If we examine the trend of other diseases, we find that the apparent epidemic outbreaks of appendicitis correspond to the high points of epidemic diarrhea, and the low points are in the years where epidemic diarrhea was rare. The factor for correlation between the annual fluctuations of the male death-rates for appendicitis, five to thirty-four years of age, and epidemic diarrhea is 0.9309 ± 0.0283 , or almost perfect. That there is a close connection between epidemic diarrhea and appendicitis at the young ages, is also brought out by other facts. During 1911 the seasonal variations of the two diseases were the same in England and Wales; in the quarter July to September, at which time the diarrhea epidemic attained to its maximum, there were 813 deaths from appendicitis against an average of 639 for the other three quarters of the year. We also find this coincidence between the high levels of appendicitis and diarrhea in other countries. In the German Empire the number of deaths from appendicitis were, in 1910, 1911 and 1912, respectively, 3,826, 4,193 and 3,783; from diarrhea, during the same period, 98,220, 153,546 and 77,086. In Switzerland the highest mortality from appendicitis was recorded in 1906, during which year diarrhea caused a very large number of deaths. In Scotland we find the same correlation between diarrhea and appendicitis.

The bacteria most frequently connected with epidemic diarrhea are the streptococcus and the bacillus coli

communis, or the same as generally found in appendicitis. The epidemic diarrhea is most prevalent in the two first years of life, whereas appendicitis has its maximum mortality at the age of about ten years. This may be explained, however, by the assumption that climatic or other conditions favor the growth of one or both of these bacteria during a certain year, and that the condition of the human body favors an attack on the small intestine during the first two years of life, but on the appendix vermiformis in later childhood.

Urban and Rural.—During the period 1910–1913 the mortality from appendicitis in the registration states of the United States was 111 per million population; in the registration cities it was 152 per million during the same period. This difference, however, is probably largely due to the deaths of non-residents in the city hospitals, as a larger number of appendicitis cases than of any other disease are treated in hospitals. In countries where the deaths of non-residents are charged back to their places of residence we do not find this difference. In Sweden, during 1911, the mortality from appendicitis was 83 per million of population in rural districts, and only 78 per million in cities. In England and Wales, during the period 1911–1913, the standardized mortality rates from appendicitis were 84 per million male population and 59 per million female population in urban districts; in rural districts it was 73 for males and 59 for females. If we examine the age distribution of the deaths we find that the difference is almost entirely among

males of the younger ages, where we know that appendicitis frequently assumes epidemic character. This could naturally be expected, as the urban crowding of people favors infection.

East and West.—When comparing the mortality from appendicitis in the eastern and western states of this country, we almost invariably find the highest mortality in the West; but this prevalence is not equally prominent in all the age groups. In the East a far higher proportion of the deaths occur during childhood and youth than is the case in the West. During the years 1907–1913, the mortality from appendicitis in ages under twenty was even higher in Massachusetts than in California, 108.6 against 102.5 per million population. This is evidently connected with the lower diarrhea mortality in the West. In the ages from twenty to forty-nine years the death-rate is 100.5 in Massachusetts against 131.9 in California. In this period the connection with diarrhea is evidently less pronounced and the determining factor is the transit facilities, densely populated Massachusetts having in this respect the better of the more sparsely settled western states. In the ages above fifty the mortality from appendicitis is about equal in the West and East: Massachusetts shows 116.3 and California 115.9. This is readily explained by the fact that at the higher ages a slow development of the disease is more frequent than in middle life. An early operation, therefore, is less imperative in this period of life and distance ceases to be death's most powerful ally.

These last few figures show us how necessary is an age analysis of every lump sum mortality rate. By simply comparing the higher appendicitis death-rates in the West with the corresponding lower rates of the eastern states we might commit the error of attributing this difference to a single cause, as, for instance, difference in meat consumption, or climate. But the equality of the western and eastern mortality in the higher ages shows that no such factor is of importance.

Appendicitis and Race.—In his work on "Appendicitis and Other Diseases of the Vermiform Appendix," Dr. Howard A. Kelley summarizes the question of appendicitis among negroes in the following sentence: "The negro race, however, seems to be comparatively exempt from the affection." The official mortality statistics for the southern states, however, do not seem to justify this statement. The data for the whole registration area of the United States cannot be utilized for such investigations as it would be unreasonable to compare the negroes in the South with white men living under different conditions in the West and in New England. We have to use the data for the same state in order to get a true comparison. If we compare the death-rates from appendicitis in Maryland, for instance, we find only slight difference between white and colored; during 1907-13 the mortality was 79.8 per million population for white, and 83.5 for colored; the standardized rates (based on the population of England and Wales, 1901) were 78.9 for white and 81.3 for colored. It may in this connection be mentioned that

it is unnecessary to standardize the mortality rates for appendicitis, because it is a disease not confined to a single age period and the two crests in early and late life will almost always counterbalance each other. If we compare the death-rates by ages we find that the colored rates are considerably in excess during the ages of about twenty to forty-five, but very much lower in the higher ages. This would suggest, when compared with our previous experiences, that the registration of appendicitis deaths among negroes is not yet complete. This does not necessarily imply a higher frequency of appendicitis cases among negroes, as we know from the experience of the Johns Hopkins Hospital of Baltimore that the case fatality is much higher among negroes, but the colored people are not even comparatively exempt from appendicitis. Also among other races is appendicitis frequent. The statistics of Japan and Singapore show it to be a common disease among the Mongolian race. We meet with it in the reports from the hospitals of India, among the natives of Africa and of the Fiji Islands. As no age is exempt, so we find that no race or nationality is exempt from inflammations of the appendix vermiciformis.

Appendicitis and Occupation.—We know very little about the prevalence of appendicitis by occupations. The United States Mortality Statistics for 1908 made a study of occupational mortality; in Tables VII and VIII are given the percentage of deaths from all causes due to appendicitis in each occupation. It is seen from these

tables that appendicitis is most frequent among people of professional or clerical service, least so among laborers. Some of the percentages are for males: journalists, 3.3; teachers, 2.4; engineers and surveyors, 2.2; bookkeepers and clerks, 2.1; artists and architects, 1.8; bankers and brokers, 1.7. All the low rates we find among laborers: millers, 0.3; janitors, 0.3; sailors and fishermen, 0.5; gardeners, 0.5; masons, 0.5; blacksmiths, 0.6; coopers, 0.6; plasterers, 0.6; railroad employees, 0.7; carpenters, 0.7. That the nervous strain of professional life is the cause of this is mere conjecture. The more probable explanation is that clerical and brain work is generally sedentary work and favors constipation, which again favors bacterial growth in the intestines. The data for females confirm this conclusion, the percentage being 5.4 for stenographers and typewriters, 3.2 for bookkeepers and clerks, and 2.3 for milliners, but only 1.0 for servants and 0.8 for laundresses.

Conclusions.—There is no evidence that the apparent increase of appendicitis mortality is caused by a greater frequency or virulence of the disease, whereas many facts indicate that this increase is simply caused by the shifting of deaths from other groups.

Appendicitis is met with in all ages, from birth to extreme old age. It has its highest mortality in the age period of ten to fourteen years, but attains another high point in later life, for males in the sixties, for females in the seventies.

No race or nationality is exempt from appendicitis; the mortality is about the same among negroes as among

white people. It is frequent also among the Japanese and Chinese.

Appendicitis is much more frequent, especially in the younger ages, during the years of diarrhea epidemics. The annual fluctuations of appendicitis are closely connected with the prevalence of this disease.

Appendicitis shows also a close connection with rheumatic fever.

The mortality from appendicitis is, other things being equal, highest where mountains or long distances make transportation to hospitals difficult. This is most pronounced in middle life.

Appendicitis is of about equal frequency in urban and rural communities. In cities it is more common in childhood and youth because of the higher frequency of diarrhea in cities; but on the other hand, the mortality is higher in rural districts during middle life because of the longer distances to hospitals.

Appendicitis is most frequent in occupations with much sedentary work, probably because this favors constipation.

The statistical method can be a great help to the medical investigation of appendicitis, as in many other diseases. What we need most is exact statement on the death certificate of the nature of the disease. This detailed information given, the data should not be combined into too few groups but given in great detail according to age, sex, race and character of the disease. We also need an exact statement of the incidence by age of the several bacteria found in the diseased vermiform appendix. It is not

possible at present to determine for certain whether we, in the cases we term appendicitis, are confronted with a single disease or several diseases of

different origin. A notification of the cases of the more important non-infectious diseases, although very desirable, belongs probably to the far future.



THE COMMON DANGERS OF DAILY LIFE.

The annual reports of Dr. F. J. Waldo, as coroner for the city of London and Southwark, invariably throw light on many problems of direct interest to the public health service. It is not too much to say that Doctor Waldo has magnified his office, for he has made wise use of the publicity attending the holding of inquests to elucidate and warn the community regarding the common dangers of daily life.

During the year 1915 Doctor Waldo inquired into the circumstances of 696 deaths and non-fatal fires—an excess of 58 over the number recorded for 1914. As regards traffic fatalities, he held 63 inquests—the highest number since the introduction of motors yet recorded by him. He points out that the marked increase in those deaths, throughout London, synchronises with the darkening of the streets and bridges dating from the first order rendered necessary by Zepelin raids, made on the 1st October, 1914. In a large proportion of cases traffic fatalities are brought about by the careless disregard of pedestrians for their own personal safety. Attempts are frequently made by them to cross streets without troubling to look for a refuge or subway, or, at night, for a lighted part of the streets which would afford the driver, with his diminished lights, an opportunity of seeing the pedestrian in time to avoid running over him. Pedestrians, again, frequently fail to look for on-coming traffic, and as often as not cross the road concealed from behind or in front, as the case may be, of a stationary or slow-moving vehicle, without making sure that fast traffic is not passing in either direction. As regards prevention, the most pressing needs emphasized by Doctor Waldo are: 1. More street refuges—including such in broad streets along which tramcars run. 2. More police, stationed especially at traffic crossing points. 3. More life-guards or fenders—at least in the shape of side-guards for hind wheels—for all heavy motors.

Referring to criminal deaths, Doctor Waldo points out the great usefulness in his two districts, of the Hercher apparatus for the preservation of unidentified bodies by the agency of formalin—the only apparatus of the kind yet installed in any mortuary connected with a coroner's court. It would certainly seem that in the interests of justice, quite apart from other reasons similar apparatus should be provided in

every coroner's district. Touching the subject of anaesthetics, Doctor Waldo notes that in all cases save one, death was due to or accelerated by the administration of chloroform, or a mixture containing this substance. It is a gratifying fact, however, that of late years there has been a marked decline in the number of deaths under anaesthetics.

On the working of the Pharmacy and Poisons Act, Doctor Waldo says: "Juries have from time to time agreed with me that the habit of drug-taking was a public danger, destructive alike of the bodily, mental, and especially of the moral faculties, and that every means ought to be taken to prevent the evil; and that greater restriction of the sale of dangerous drugs, such as laudanum or tincture of opium, was urgently needed in the public interest." With this object in view, Doctor Waldo gives a copy of the correspondence between himself and the Lord President of the Privy Council, the supreme authority who decides which drugs are to be scheduled under the Poisons Act, and in which part of the schedule each poison is to be placed. He pointed out to the council that since the introduction in the *Pharmacopoeia* of 1914 of a stronger laudanum, two "laudanums" of different strengths might be purchased by the public, and that it was only necessary to sign in the poisons book for the stronger tincture. Further, that "considering the deadly properties of the drug, and that one drop of the weaker 'laudanum' has been known to kill a baby, so long as the two kinds are allowed to be sold under the same name, fatal mistakes between the bottles containing the poison are bound to happen, and the number of unnecessary deaths accordingly increased. It would be greatly to the public interest if the Privy Council disallowed the use of the word 'laudanum,' save only as a synonym for the new (1914) variety." This suggestion has not yet been carried out, but, as a compromise, the Privy Council wrote the coroner saying that by Order of Council of 9th February, 1916, henceforth the weaker laudanum would come under the same restrictions as the stronger, and might only be purchased from chemists by those personally known or introduced to them after signing the poisons book.—*Medical Officer*. London, May '27.

THE BACILLUS CARRIER AND THE RESTAURANT.

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ONE of the noteworthy manifestations of modern industrial expansion is a marked division of labor and a progressive development of occupational specialization, and the inevitable outcome of this movement is an ever-increasing concentration of individuals within restricted areas. The health problems arising from the rapid increase of urban populations are of such magnitude and complexity that public opinion will eventually demand an installation of thoroughly trained experts to cope with them.

Prominent among these problems is that of the public and semi-public restaurant. Economic and domestic conditions have forced large numbers of city dwellers to obtain one or several meals per diem from restaurants and delicatessen; these public eating places are gradually displacing the time-honored system of home-cooking. Undoubtedly there are advantages and disadvantages in this change; from the viewpoint of public health there is cogent danger in an uncontrolled development of this character. The public restaurant is a potential factor in the spread of certain types of disease because foods from many sources, manipulated by many hands, are dispensed to many patrons.

The occasional dissemination of disease through food is well established; infected shellfish, milk, meat and vegetables have been shown to transmit

typhoid bacilli and the viruses of other excrementitious diseases, botulism, and that large and somewhat poorly defined group of gastro-intestinal disturbances commonly classed as food poisoning to susceptible individuals who partake of them. These diseases can be transmitted through food without the mediation of the restaurant, and the chief importance of the latter in this association is to provide a distributing point for infected food. Fortunately the efficiency of national, state and municipal food inspection reduces the danger of infection from raw food stuffs to a minimum. On the other hand, the rapid increase in the personnel of the catering industry automatically increases the danger of infection of food prepared and handled in the restaurant, for it is obvious that the greater the number of individuals engaged in manipulating the food of the public the greater are the chances that bacillus carriers will be drawn into the public culinary service. A bacillus carrier engaged in preparing or serving food for a multitude is a greater menace to the public health than would be the case if these same activities were exercised in but a single family. The association of infection with a carrier is usually evident in the home, but for obvious reasons it is frequently difficult to establish in the restaurant. Judging from available evidence, the

restaurant does not appear to be a potent factor in the spread of disease, but a potential danger exists, as the following actual experience clearly shows:

Seventeen cases of typhoid fever developed among the five thousand employees of a large departmental store within two weeks. There was little typhoid in the city at the time—rather less than usual—and the cases were so widely distributed among different departments that no single intramural factor could be advanced to explain this sudden outbreak. A thorough examination of the entire plant failed to reveal a plausible source of infection. All of the patients were accustomed to eat their midday meal in a nearby lunchroom. An investigation of this lunchroom revealed the very significant fact that several cases of typhoid fever had developed among the employees; a waitress recently convalescent from typhoid was the probable source of infection. This view was sustained by a prompt cessation of new cases when the lunchroom was closed.

The departmental store in question maintains a restaurant department which requires about two hundred and twenty-five employees—cooks, waitresses and scullions—for its operation. It was probable, but not absolutely certain, that none of the restaurant employees had eaten in the lunchroom; if they had eaten there they had been definitely exposed to infection. The infection might develop as a mild ambulatory case of typhoid fever, or the bacillus carrier state, either of which would be serious because an unrecognized ambulatory case, or a

bacillus carrier working in the restaurant might transmit the disease to a large number before the condition was realized.

The most pressing and immediate problem obviously was to formulate a plan, simple in procedure and efficient in operation, which could be utilized at once to eliminate the possibility of infection of employees or patrons of the restaurant, pending an individual search among the former for incipient and ambulatory cases of typhoid, and for carriers. These measures were to be supplemented by a rigorous examination of all new employees prior to their admission to the restaurant staff.

The portal of entry of the typhoid bacillus is the mouth, to which it may be carried directly by infected fingers, and less directly in infected food, milk, or water. This explains the relation of the restaurant to the spread of typhoid.

The typhoid bacillus leaves the body of the typhoid patient and the typhoid bacillus carrier in the feces, and less commonly in the urine. The hands of a typhoid carrier are exposed to direct infection from the feces or urine one or several times daily and it requires little imagination to follow the organisms from the infected and imperfectly cleansed fingers of a cook or waitress to the mouth of the prospective victim. It would appear, therefore, that bacterially clean hands would be an extremely important factor to insist upon among the employees of a restaurant.

The plan adopted consisted first of an explanation in simple terms to the

employees of the possibility and mode of infection, and the efficiency of soap and the thorough scrubbing of the hands, with the necessary demonstrations; then the enforcement of hand cleansing under the supervision of a nurse of strong personality. Each employee was required to "scrub up" before entering the space set apart for the restaurant, in the morning, after the noon recess, and after an absence during the day. The entrance to the restaurant department happened to be so arranged that this plan was feasible.

Efficiency of the Method.—The success or failure of scrubbing the hands depends obviously upon the sterility of the brush and the washing water, that is, their freedom from typhoid bacilli and similar organisms, the thoroughness of the individual effort, and the efficiency of the supervision. The sterility of the brush and the water, that is to say, the absence of pathogenic bacteria, can be practically insured by keeping the former in a disinfecting solution and using water of known purity. The water supply of the store under discussion was filtered and known to be free from colon bacilli and similar organisms; the soap used was one containing a moderate amount of a phenol derivative.

The bacterial efficiency of the scrubbing process is indicated by the following experiment: A series of seventy-two fruit jars, each containing a small amount of absorbent cotton and 200 cc. of water, was sterilized in the usual manner. Each of seventy-two employees was required to wash his hands with the cotton, rubbing it thoroughly under each finger-nail, and

then to replace the cotton in the jar, which was sealed and numbered. Sixty of the seventy-two had previously scrubbed their hands under supervision; twelve washed their hands without the preliminary scrubbing. The jars were sent to the laboratory and examined for *Bacillus coli*, it being assumed that the absence of this organism would be a strong indication of the practical success of the cleansing process.

The cotton was squeezed approximately dry with sterile forceps, and 0.1 cc. and 1 cc. respectively of the water from each jar was planted in lactose broth in the usual manner. After forty-eight hours' incubation the water in which each of the twelve unscrubbed individuals had washed his hands showed *Bacillus coli* in 0.1 cc. The samples of water obtained from the employees who had scrubbed their hands prior to the experiment showed no colon bacilli even in 1 cc. This experiment, carried out under strict supervision, was deemed sufficiently conclusive to warrant a tentative assumption that the danger from infection by an unrecognized bacillus carrier was reduced to a minimum. Of course, the measure did not influence the possibility of infection through milk or other food-stuffs contaminated outside the store, and it does not take cognizance of respiratory diseases spread by droplet infection.

Attention was now directed to an examination of the two hundred and twenty-five employees comprising the restaurant personnel for typhoid carriers. Two laboratory possibilities

present themselves for this purpose,—the actual isolation of the typhoid bacillus from the feces or urine, which is conclusive, and the Widal reaction. It is well established that a majority of convalescent typhoid patients give a positive Widal reaction which may persist for months or years after clinical recovery. Many typhoid bacillus carriers also have a positive Widal, hence it was deemed logical to examine the blood of each employee for the presence of agglutinins specific for *Bacillus typhosus*. The dried blood method was used. It was realized that a positive Widal reaction does not necessarily indicate a bacillus carrier—a majority of recovered cases do not become bacillus carriers; a positive reaction also may result from a prophylactic immunization with typhoid bacilli. A negative Widal reaction conversely does not necessarily exclude bacillus carriers, incipient infections or ambulatory cases, because agglutinins specific for the typhoid bacillus do not appear in every convalescent case, nor do they appear regularly during the first week of the clinical disease. Four positive reactions were found among the two hundred and twenty-five employees, but repeated examinations of their feces and urine were negative for typhoid bacilli. It is probable they were not carriers.

The final proof of a bacillus carrier, as stated above, rests upon a demonstration of typhoid bacilli in the feces or urine. An examination of urine for typhoid bacilli is relatively simple. Upon Endo plates the typhoid bacilli grow readily and in relatively pure culture as a rule. The urine samples of

all of the employees were negative for typhoid bacilli; many, however, showed colon bacilli, due largely to the necessarily imperfect method of collecting the samples. Seventy-six samples of feces were examined for typhoid bacilli, all of them being negative. This latter method was abandoned, partly because of the difficulty in getting feces, partly because the subsequent control of the hand-scrubbing method showed that it retained its efficiency. One bacillus carrier was detected—a cook convalescent from illness of several weeks' duration reported for duty. The urine, feces and blood were submitted for examination. The Widal reaction was positive and typhoid bacilli were found in the feces, but not in the urine. The individual was informed of his condition and was not admitted to the restaurant staff.

This investigation together with a conference with the administrative and executive officers of the store led to the establishment of a policy along the lines indicated above, which was to be rigorously maintained. A survey of the sources of milk and various foods brought to the store indicated that the sources of supply were as safe as it is possible to obtain them commercially.

Supervision of manual cleanliness maintained along the lines indicated above, with the coöperation of the management, the nurse and the employees should reduce the potential dangers of bacillus carriers to a minimum, and the relatively slight cost of the protection afforded is more than compensated for by the feeling of relative security both from the viewpoint of the store and of the patrons.

PUBLIC HEALTH PUBLICITY.

EDWARD A. MOREE,

Director of the Atlantic Division, American Red Cross.

V. Newspaper Advertising.

A NEWSPAPER is conducted by its proprietor to make money.

Many social workers seem to forget this. The newspaper proprietor makes his money chiefly through the sale of advertising space. His advertising space has value because he sees to it that the news he prints attracts readers. These readers pay a very small sum for the privilege of reading his news. In the case of a penny paper, the price scarcely pays for the paper upon which it is printed.

In the fourth article of this series, I attempted to show that the production of a newspaper was a highly complicated process, involving the organization of a large staff and the use of an expensive plant. I also attempted to show that the only test applied by the wise newspaper editor to copy submitted for publication was this: Will it interest any large number of people?

If a man goes into the business of manufacturing baked beans, he will not bake red kidney beans if he knows that a very large proportion of bean eaters prefer white beans. I venture to say that no bean baker would listen for a moment to even the most impassioned appeal from the secretary of the American Association for the Amelioration of the Condition of Growers of Kidney Beans that he

bake kidney beans instead of white beans. The bean baker might be willing to make a considerable contribution for the relief of the suffering families of the growers of kidney beans, but more likely he would furnish large quantities of white bean seed and conduct a campaign of education among the growers of kidney beans to convince them of the error of their ways in sticking to kidney beans when the demand was for some other kind.

THE WHITE BEAN OF NEWS.

Most newspaper proprietors know the difference between the kidney bean and the white bean in news. They know that people who buy newspapers are not interested in a great deal of the material that is submitted to them for publication by health officers and other social workers. Newspaper men have tried to impress this upon social workers and have tried to show them that in giving up valuable space to the publication of matter that is not news, they are losing both the value of the space and the interest of their readers.

In every social service movement, and especially in public health work, there is a wide range of facts that should be placed before the public but that can under no circumstances be classed news. In public health



Help Them Grow Up Strong and Healthy

Tuberculosis is particularly dangerous to children. Infected in childhood, their weakened constitutions must be strengthened to combat the disease.

Thousands of children are being protected from Tuberculosis in open air schools, and many already attacked

are being cured with the money received from the sale of Red Cross Christmas Seals. The lengthened lives of little children will be your Christmas blessing if you buy

RED CROSS Christmas Seals

A good way to sell Christmas seals.

are all important health information that can be given to the press in the form of signed articles or unsigned special stories. Only three requirements are placed upon this kind of article by the editor: one, it must be scientifically accurate; two, it must be in newspaper style; three, it must hold interest both as to subject matter and presentation.

The health officers who can meet the second and third of these requirements are scarce. You could count on the fingers of two hands (in fact I think you would need only one) the physicians who can write an interesting essay on a baby's stomach-ache or build an instructive printable article on a sanitary privy. Physicians generally in trying to produce popular newspaper or medical articles find themselves victims of faulty environment. They speak a language utterly foreign to the average reader and they elaborate details that are important in a clinic but have practically no value in a newspaper where human interest must hold sway.

TWO OTHER PUBLICITY AVENUES.

The health officer, barred out of the news columns because his information is not news; barred out of the special field because he cannot write popular "stuff," still has two avenues through which he can reach his public. He can print circulars and pamphlets or he can buy newspaper advertising space. The former has the sanction of long usage and but little else to recommend it; the latter has the approval of almost the entire business world. Show me a business man who depends on circulars and pamphlets to reach his public with information about his goods and I will show you one who is headed for bankruptcy.

The preparation of circulars and pamphlets has long been a feature of public health education. The successful employment of such means of publicity involves, however, the very difficult problem of circulation. Most annual reports contain interesting figures on the number of pamphlets distributed. No estimate is ever given

as [to] the number of these that are read. Judging by the usual method of distribution, an estimate that approximated fact would not make a very creditable showing.

Circulars of information on health subjects distributed at county fairs, motion picture theatres and churches have a very limited value. It is like sowing seed in soil that has not been properly prepared. One would scarcely think of planting onions in a bed that has been prepared for roses. Any one who sowed wheat in a field that was suitable only for celery would not only lose money but before long would be visited by a commission to inquire into his sanity.

USELESS EFFORT.

People who go to motion picture shows, to county fairs, or to church are bent upon some object entirely foreign to public health. Fair crowds and motion picture audiences are looking for amusement. They are not interested in tuberculosis and typhoid fever. Those who go to church are either bent upon worship or are sore because it rained that day and they could not play tennis or golf. In either case they are not in the proper frame of mind to assimilate public health information. Lectures or circulars given to such crowds are just one step short of useless.

VERMONT
STATE BOARD OF HEALTH

REGULATIONS
RELATING TO

Contagious Diseases

The following diseases **MUST** be reported to the
HEALTH OFFICER

By

(a) The head of the family in which the disease occurs.
(b) The physician called to attend such a disease.

Typhoid (enteric) Fever
Smallpox (Variola, Varioloid)
Chickenpox (Varicella)
Measles (Rubeola, Morbilli)
Scarlet Fever (Scarlatina, Canker-rash)
Whooping Cough (Pertussis)
Diphtheria (Croup, Membranous Croup)
Mumps (Epidemic Parotitis)
German Measles (Rotheln)
Infantile Paralysis (Polio-myelitis)
Epidemic Cerebro-spinal Meningitis (Spotted Fever)
Erysipelas
Tetanus (Lock-jaw)
Ophthalmia Neonatorum (Eye Disease of the New-born)
Hydrophobia Rabies
Anthrax
Glanders

THE HOUSE MUST BE POSTED
with a card bearing the name of the disease in cases of Typhoid Fever, Smallpox, Chickenpox, Measles, Scarlet Fever, Whooping Cough, Diphtheria, Mumps, German Measles, Infantile Paralysis and Epidemic Meningitis.

ALL THESE DISEASES, EXCEPT TYPHOID FEVER MUST BE QUARANTINED.

The card may be removed **ONLY BY THE HEALTH OFFICER** at the termination of the Quarantine.
(See Sec. 5441 Vermont Statutes)

Watch further advertisements for more details.

No. 2.

VERMONT
STATE BOARD OF HEALTH

PHYSICIANS
AND

HEADS OF FAMILIES
TAKE NOTICE!

LAWS
RELATING TO

Contagious Diseases

These diseases **MUST** be reported to the
HEALTH OFFICER
(See Sec. 5434 of the Vermont Statutes)

By

(a) The head of the family in which the disease occurs.
(b) The physician called to attend such a disease.

The physician is required to "immediately quarantine" at his first visit.

If the physician is "unable to make a specific diagnosis" at the time of his first visit, he may quarantine until such a diagnosis can be made.

Such quarantine is in force until the health officer can examine and quarantine.

Attending physicians must report such cases as they SUSPECT may be "infectious or contagious," as well as those they KNOW to be such.

"A head of a family or a physician who fails to give reasonable notice to the health officer of the existence of such disease shall be fined not more than \$50-nor less than \$10 with costs of prosecution."

Watch future advertisements for more details.

No. 1.

If house to house distribution of hand bills and circulars in your city is not prohibited by city ordinance, it should be. It is in most cities. The



Your boy is in safe keeping.

But there are a great number of little unfortunates who literally LIVE ON THE STREETS and who get the wrong kind of training and education there.

It is for these other little boys that the Boys' Clubs are being organized and equipped.

To carry on this work properly we have undertaken to raise **\$500,000. by January 21st** for a new building, for gymnasium apparatus, for books and magazines—for the necessary equipment to care for the boys in a careful, effective way.

Won't you help in this splendid work of building better boys?

You are invited to visit the Boys' Club at 161 Avenue A, to see for yourself what wonderful help is being given the other little fellows.

GIVE NO MONEY TO
ANY SONGSTARS

Send contributions to
E. M. POTTER, Treasurer,
The Boys' Club Association of New York
44 Wall Street.

Don't you want to help the other little boy after reading this?

fact that many cities have ordinances on this subject, is conclusive proof that the practice is an insufferable nuisance.

Sending circulars through the mail is therefore the only means of much value left to the health officer for the distribution of information prepared in this form.

The first problem presented by the mailing method is that of selection of list. Any list employed will of necessity be incomplete. It will not reach every one who should be reached.

COST OF MAIL CIRCULARIZATION.

A correlated problem is cost. Unless you know exactly the group that it is most important to reach with any particular piece of health information and know where you can get a list, the only recourse is the broadest possible general list. This is usually the registry list which includes all voters. To cover a city of 50,000 on a registry list involves using a list of not less than 10,000. The cheapest possible method of mailing would be an unsealed one cent stamped envelope with a hand written address. This would cost not less than three cents per letter, and might run up to more than four cents depending upon the cost of the circular and the difficulty of enclosing it. The cost of reaching such a list, therefore, would be not less than \$300. For this \$300 you would probably actually reach not more than one tenth of the list you use with the facts that you desire to present. You would therefore reach about one fiftieth of your total population. You would not reach women, unless you live in a suffrage state; you would not reach children and you would not reach the thousands of men who are weary of circular letters.

For special kinds of information, intended for special groups, some form of mail circularization is probably the best plan. In order to be effective, however, it would have to be done on a more expensive basis than the one cent unsealed letter. A two cent stamped envelope with a personally written letter or a letter so carefully filled in that it is indistinguishable from the typewritten letter would

give you more nearly 100 per cent. efficiency. The expense of this and the mechanical difficulties in the way of it make it possible for only relatively small lists.

WHERE CIRCULARS ARE VALUABLE.

The distribution of special information to labor unions, in their meetings, to school children, in the schools; or to parents through the school children (if the information is about children) may bring good results. Circulars are valuable in connection with exhibits because people who visit exhibits are after public health information. Visiting nurses and health officers will always find circulars of value when put in the hands of patients or members of their families. And there you have said about all that can be said for the ubiquitous nuisance.

Many features of public health publicity fail to bring adequate return for the effort expended. It is unfortunately true that most health departments do not know how much of their public health education actually reaches the people it is supposed to educate. This is especially true of the circular type of publicity. Its chief disadvantage, besides expense and difficulty of distribution, is that it either does not reach the person for whom it is intended or it reaches him at a moment when he is not mentally attuned to that particular kind of information.

Probably no health officer has ever tried going along the street tapping people on the shoulder indiscriminately and informing them that "Tuberculosis is preventable" or admonishing them to "swat the fly." Not the fly

but the health officer would be "swatted."

And yet that is practically what is done when we attempt to force our public health educational efforts into all sorts of places, to catch people unawares and spring upon them some of our highly important but uninteresting information. In most of these attempts, we are a little more than psychological pick-pockets or mental highwaymen. We spring upon the intellects of our people and hold to their heads our automatic publicity guns and make them stand and deliver their interest.

I have seen health officers and other social service workers rub their hands in glee at discovering what they choose to term "a ready made audience," to which they can either distribute circulars or make a speech, without the trouble and expense of getting the crowd together. The value of such audiences is extremely limited. People do not like to be pounced upon with facts much more than they like to be pounced upon with a black-jack.

ONE HUNDRED PER CENT. EFFICIENT PUBLICITY.

Nearly everyone will agree that the nearest approach to 100 per cent. efficiency in public health education is talking directly to a person who has come to the health department for the purpose of getting information. The nearer you can approach this relationship to your public, the nearer will you approach a perfect score.

A person reading a newspaper is seeking information; he is in the right mental attitude to receive information.

The Children's Hospital of Philadelphia
 TWENTY-SECOND STREET BELOW WALNUT



Has for over sixty years been dispensing free medical and surgical treatment to children, most of whom are of poor parents.

This work has been supported entirely by voluntary contributions, but its people has assumed such proportions that we need additional funds.

Here is your opportunity to help brighten the future and strengthen the bodies of weak children who otherwise will likely grow up to be burdens to themselves and the community.

Send your contribution to **WILLIAM WHITE, Treasurer**, 2201 Chestnut St., Philadelphia.

EDWARD S. SAYLES, President

HOSPITAL OF THE WOMAN'S MEDICAL COLLEGE OF PENNSYLVANIA
 2121 NORTH COLLEGE AVENUE

DONATION DAY, SATURDAY, FEBRUARY 12, 1916

Hospital open for inspection from 11 a. m. to 5 p. m.

Visitors will be received by the Managers at the College Building (adjoining the Hospital on the east), where tea will be served from 3 until 5 o'clock.

The managers will be grateful for donations of money, groceries, provisions, women's wrappers and underclothing, infants' clothing, towels, table linen and bedding.

Take car 16 on Market street to North College avenue.

Checks should be made payable to **EMMA KLAHR, Treasurer**

An Institution Works of Your Encouragement

THE WESTERN HOME FOR POOR CHILDREN IN PHILADELPHIA

41st and Marion Sts. Founded in 1860

Here 60 poor and orphan children are being educated along practical lines which fit them for useful work when they leave the Home. They receive the best of care and attention, so that in sixty years but thirteen deaths have occurred.

The needs of the Home are great and growing, and contributions to its maintenance and legacies for its endowment are earnestly solicited by its managers. These should be sent to:

MRS. HENRY T. DEWEY, 3350 Walnut Street, First District
JOHN P. HOLLINGSWORTH, Treasurer, Stock Exchange Building

THE PHILADELPHIA Home for Incurables
 48th St. and Woodland Ave.

Ministers to sick and helpless men, women and children. Absolutely non-sectarian. Makes no distinction of age, sex or creed. Providing the peace and comfort of a permanent home with the skill and care of a hospital.

Two large hospitals are exclusively occupied by cancer patients. One large home is for children only.

Many men and women are totally ignored. Money is greatly needed. The Home is practically supported by voluntary subscriptions and donations. The endowment fund is small, the welfare list is long.

Will you respond to this appeal for suffering incurable invalids?

Mrs. Charles W. Reiss, Pres. Mrs. Charles Harmon Thomas, Treas.
 3125 14th St. 1814 Chestnut St.
 Mrs. H. B. Prentiss Nichols, Cor. Secretary 246 Pontiac Road, Germantown

Pennsylvania Society for the Prevention of Tuberculosis
 1701 Chestnut Street. Organized 1892.

Is the Oldest Society in the World for the Prevention of Tuberculosis

We invite you to become a member. Life membership, \$100.00 or more; sustaining membership, \$25.00 or more annually; active membership, \$2.50 to \$25.00 annually. Your Church, Lodge, Society or Club can become a Fraternal Member by paying \$10.00 annually. This Society is supported largely by Voluntary Contributions.

RENE FENNER SMITH, Jr., Executive Secretary

Franklin Day Nursery
 719 Jackson St.

Conserves the health and lives of 90 children of poor working women daily. Helps and encourages the tired mothers in their struggle for existence and keeps the home together.

Please send donations of groceries, clothing etc., to the Nursery. Checks to

Mrs. George Quintard Horwitz
 1721 Walnut St.

Mt. Sinai Hospital
 Fifth below Reed Street

Affords medical and surgical relief to the sick poor, irrespective of race, color or creed.

We treated 67,181 patients during the year ending April 1, 1915.

99% Were Free Patients

We are handicapped for lack of funds.

Will you help us increase our usefulness?

JACOB D. LIT, PRESIDENT

ROOSEVELT HOSPITAL
 710 North 5th Street
 NON-SECTARIAN

We wish that it were possible for all the charitably inclined people of Philadelphia to personally inspect the conditions in our community and the great service this hospital is rendering. Surely we would not then be hampered by lack of funds.

Over 85% of the patients are treated gratis

CHAS. L. GLANZ, Treas. 623 Market St.
FRANKLIN BRADY, M. D. 1815 Frankford Ave.

PRESTON RETREAT
 TWENTIETH AND HAMILTON STREETS.

A Lying-In Hospital for Indigent Married Women of Good Character—Founded by Dr. Jonas Preston in 1837. A Special Free Course for Graduate Nurses in Obstetric Training is Maintained.

At no time is kindness and skilful treatment more necessary than at the time of childbirth, both for the mother and for the child.

The Preston Retreat has room for 55 patients and most modern equipment, but because of lack of running expenses it can accommodate only fourteen.

We appeal to you to help us rectify this condition.

ELI KIRK PRICE, Treasurer JOHN STONE JENNER, President, 1800 Walnut Street.
GEORGE D. PORTER, Secretary, 2318 Wayne Avenue

Old Man's Home
 A Real Home for Respectable Homeless Men

39TH STREET AND POWELTON AVENUE
 Incorporated 1864

186 men in the Home. We ask charitably people to remember our work and help us maintain and continue it. The Home is non-sectarian.

MRS. EDWARD BROWN, President, 348 South 13th Street
FRANK T. FRANKLIN, Treas., 1710 Locust Street
MRS. J. C. THOMPSON, Jr., Secy., 1814 Chestnut St.
MRS. GEORGE L. HARRISON, Jr., 3012 E. Locust Street

The Home Missionary Society
 OF THE City of Philadelphia
 Founded 1813

Non-sectarian—Established by the Churches

An Auxiliary to All the Churches FOR THE RELIEF OF THE POOR

FOR THE CARE AND UPRISING OF THE SICKLY CHILD

Office: 151 Arch Street

Treasurer, President Life and Trust Co. Superintendent, Rev. W. Arthur Weaver

All phases of relief work are undertaken—From birth to old age. Children abandoned by indolence and neglect for until twenty-one years of age. Our territory covers the whole city.

The Lincoln Day Nursery
 1706 Bainbridge Street

REMEMBER DONATION DAY
 FEBRUARY 12th

The Birthday of the Great Emancipator of the Colored Race

Hold us carry on this work of giving the colored children a fair start in life. Give them clothing, shoes, medicine, food and recreation. Victory always comes.

Mrs. C. HOWARD CLARK, Jr., President

Harrison Day Nursery
 N.E. cor. 19th & Griswolds Sts.

Receives and cares for the children of poor working women whose employment keeps them away from home all day.

There were an aggregate amount of \$717 during 1914, 182 in donations and 535 for an average of 74 daily.

Will you help us to give these future citizens a chance to secure the right kind of a start in life?

Are you unable and financially restricted?

Mrs. JOHN H. BRIDGTON, Treas. 142 Spruce St.

The Shut-In Society

The Philadelphia Branch

Office, 1110 Chestnut Street, Philadelphia.

Established in 1858 with headquarters at 1110 Chestnut Street. The Society is for the relief and support of those who are shut in by illness, old age, or other causes. The Society is for the relief and support of those who are shut in by illness, old age, or other causes. The Society is for the relief and support of those who are shut in by illness, old age, or other causes.

Advertisements of Other Charitable Institutions Appeared on This Page Last Saturday and Will Appear Again Next Saturday.

A page of social service advertising in a Philadelphia newspaper.

He is so keen for information that he reads some portion of everything that comes before him as he turns the pages.

He skims over page after page, catching a head-line here and a picture there and delving more or less deeply

into those articles which attract his attention and arouse his interest.

The public health article, or the public health advertisement is, of course, to some degree, an interloper, even in this place. It is true, however, to a less degree than in almost any other form of public health publicity; the newspaper is recognized by every one as the purveyor of information and any form of information is in its proper place when it appears in the paper.

Your newspaper reader may be chiefly interested in baseball scores, or in some other historic event, it is true. For such a one the public health story must immediately establish its interest and establish its right to be in the newspaper, or it will be passed unnoticed. The man in search of baseball scores, however, does not feel any irritation at being tapped on his mental shoulder by a health department item and being asked to remember that typhoid can be prevented by vaccination, or that flies are a menace to health. He is accustomed to seeing in his newspaper all kinds of information, and is not surprised at anything he finds there.

In this respect he is entirely different from the man seeking amusement or attending a meeting organized for a purpose remote from public health education.

It seems true, therefore, that the newspaper reader more nearly approaches in mental attitude—in his desire for information—the person who comes to the health office than does an individual approached with health information in any other way.

WHY SHOULD WE USE ADVERTISING?

In considering the possibility of newspaper advertising, leave out of consideration the newspaper publisher's attitude; pass over his claims to our advertising patronage because, in presenting our news, he is giving us publicity of great value; neglect for the present all of his arguments based on the fact that he has just two things to sell, his paper and his advertising space and that without revenue from advertising space any newspaper would die.

All of these arguments are extremely important and almost any one is sufficient to justify paid-for space in health publicity. The strongest possible argument, however, for the use of this publicity avenue, is the fact that it provides the cheapest, most readily available, and the most efficient means of reaching the largest number of people who are in a mental attitude to receive public health suggestions.

Advertising is not comparable to free newspaper publicity in any important aspect. Suggest paid-for space to a social worker who has not considered the subject before and you will get one of two reactions. He may say:

"But we are getting all the news space we go after and if we began paying for advertising space, we would establish a precedent that would make it more difficult for us to get our publicity into the papers."

Or he may say:

"It is expensive, we can't afford to buy advertising. If the newspapers are not public-spirited enough to print

Where Your Preparedness Paraders Meet Tomorrow

Boy Scouts of America will seek to
enroll you as members of



They will ask you to sign a blank pledging yourself to at least one \$1 membership in this wonderful relief organization.

The Red Cross needs *YOU*—not for active service, but to support its efforts to relieve the suffering caused not only by the possible disaster of war, but also by the inevitable disaster of peace.

YOU and *YOURS* may some day need the Red Cross. The Red Cross needs *YOU*—*NOW*—*TODAY!*

Sign this pledge today and mail your membership fee to

H. D. GIBSON, Treasurer,

THE AMERICAN RED CROSS
287 Fourth Ave., New York.

Telling a straight-from-the-shoulder story in paid for space.

our items, we certainly cannot devote our appropriation (or contribution) to the payment of advertising."

The facts are, of course, that you cannot check paid-for advertising off against news publicity, and you cannot argue it out of court on the plea of expense.

No one in his senses would urge the use of advertising space for the presentation of news matter. If you do

anything worth while or say anything that is of news value, your papers will be glad to print it.

NEWS AND ADVERTISING.

The fact that Wanagimbel's has reduced the price of ribbon one cent per yard has actual news value, but is not a fact that is of interest to a sufficiently large number of readers to justify its presentation in news col-

**VERMONT
STATE BOARD OF HEALTH
REGULATIONS
RELATING TO**

CONTAGIOUS DISEASES

No member of any family under "Full Quarantine" shall leave the house or premises except by written permission of the Health Officer.

No member of any family under "Modified Quarantine" who has not had the disease, shall go to any public assemblage (school, church, movies, or other public gathering).

When any such diseases exist, excepting typhoid fever and mumps, the Health Officer must notify the teacher, superintendent, or head of any public, parochial or private school, or college, where any member of the family attends as pupil or teacher.

Such teacher or other person shall forbid further attendance of infected persons until notified by the Health Officer.

The Health Officer must notify the librarian of each public library in his town, giving the name of the disease and the name and address of the family.

Librarians shall not allow any books or periodicals to be taken by such family, nor any books returned until disinfecting.

No house or premises shall be released from quarantine until all infected persons and things have been disinfected and rendered harmless under the direction of the Health Officer.

THE SALE OR REMOVAL OF MILK, milk products or farm produce from premises under "Full Quarantine" is prohibited.

If milk, milk products or farm produce is produced pasteurized and stored at a safe distance from the house, and if no person from the infected house comes in contact therewith, the Health Officer may give permission for its sale or removal.

All cats, dogs and other pet animals on infected premises shall be washed before such premises are released from quarantine.

"A person who attempts to hinder the work of a health officer or local board of health, or who removes, defaces or obscures a placard or notice posted upon an infected building, or who violates, quarantine regulations, shall be imprisoned not more than thirty days or fined not more than fifty dollars or both."—Sec. 5441, Vt. Statutes.

Watch future advertisements for more details.

No. 4.

**VERMONT
STATE BOARD OF HEALTH
REGULATIONS**

Relating to

PUBLIC BUILDINGS

PLANS FOR ALL PUBLIC BUILDINGS to be erected must be submitted to the State Board of Health for approval.

This includes School-houses, Churches, Theatres, Public Halls, Hotels, Tenement Houses, Apartment Houses and Factories, more than two stories high.

Such buildings must conform to the Regulations of the Board in respect to sanitary conditions necessary for the public health and safety.

DOORS SHOULD OPEN OUT from halls and all places of amusement. Stairways should be broad, have wide treads, low rise, and short runs between landings and be railed on both sides.

PROPER HEATING, LIGHTING AND VENTILATION is required on all public buildings. Sanitary plumbing must be installed, and buildings must be maintained at all times in a clean, sanitary and safe condition.

Fire Escapes

Plans for Fire Escapes must be approved. Escapes must be kept painted, free from snow and ice, always accessible, and easily located by signs and lights. Hotels must have fire gongs.

Motion Picture Houses

Special regulations govern floor area, cubic space, ball ventilation, booth ventilation, heating and cleaning.

No. 5.

umns. When Wanagimbel wants to tell the women of the community about this epoch marking reduction in the price of ribbon, he buys space in which to tell the story.

When Wanagimbel buys a city block upon which to erect a twenty-story department store that fact holds an interest for nearly every newspaper reader. It is most valuable publicity to Mr. Wanagimbel, but he does not even consider using his advertising space to tell the story. That is news because a large number of people are interested in it.

Take up expense. If you plan an exhibit do you use only lumber that you can get free, only cardboard that is given you and employ only such

sign painters as will work for nothing? Do you hold your meetings only in the halls that are given you? Do you use only such envelopes as you can secure as a contribution to your work?

Of course not. You say: "This thing has got to be done. It is worth doing, therefore, it is a proper expenditure of the funds appropriated for my work. My exhibit will reach thousands of people with its instruction in health. That is an important public service. Therefore, I will spend some of my money for it." And of course you are right.

A NEW PUBLICITY WORLD.

If you approach the advertising question in the same spirit you will

VERMONT
STATE BOARD OF HEALTH

REGULATIONS

RELATING TO

Contagious Diseases

FULL QUARANTINE

must be observed in cases of Smallpox, Varioloid, Diphtheria, Scarlet Fever, Epidemic Cerebro-spinal Meningitis, and Infantile Paralysis.

The sick person should be isolated in the house from other members of the household.

All persons and things on premises under "full quarantine" MUST remain on such premises (this includes cats and dogs) and no one can enter such premises except the attending physician.

He may enter and leave the premises, but MUST take measures to prevent carrying the infection outside.

Papers and letters may be received but not given out.

Food, drugs, fuel and clothing may be received as necessary.

MODIFIED QUARANTINE

must be observed in cases of Measles, Whooping Cough, Mumps, Chicken-pox and German Measles.

All persons who have the disease must be isolated from all other persons.

Persons who cannot be shown to have had the disease are forbidden to attend any school, public, parochial or private, any church or place of amusement or ANY public gathering of any kind.

TYPHOID FEVER CASES

The premises must be placarded with the name of the disease.

Nurses and attendants should disinfect all discharges from the patient before removing same from the sick room.

Linen and eating utensils should be disinfected.

Hands and persons of attendants should be disinfected.

Flies and other insects should be excluded from the sick room.

All Quarantine Exists Until Terminated by the Health Officer by a Written Notice

Watch future advertisements for more details.

No. 3.

**Vermont State
Board of Health
The Great White Plague**

(TUBERCULOSIS).

Laws and Regulations Relating Thereto:

Physicians must report their cases to the Secretary of the State Board of Health at Burlington.

These reports must be on SPECIAL BLANKS; must contain certain data called for on these blanks, and must be made within

One Week!

These reports ARE NOT FOR PUBLICATION. They are required in order that we may know WHERE the White Plague is and HOW MANY people are attacked.

Without this data, it cannot be successfully fought.

No one who has the disease should

Ever Spit

except on cloths (that can be burned) or into spit cups - (which are daily disinfected).

No one with tuberculosis shall attend

School

as pupil, teacher or janitor.

After death or removal, the premises or apartments must be

Disinfected

under the supervision of the Health Officer.

BLACK PLAGUE!

The people of Vermont should know that

Syphilis and Gonorrhoea

are as bad a scourge as tuberculosis. Our legislature has recognized this, and the facts about these diseases should no longer be suppressed or communicated in whispers.

Good authorities rate them as the cause of more misery, suffering and death than any other diseases.

Until the LOCATION and NUMBER of these cases are known, they cannot be combated.

They must be REPORTED to the Secretary of the State Board of Health. (See Act 218, Laws of 1912)

The Public should know that MORAL and PHYSICAL CLEANLINESS is imperative to avoid these

Boys and girls should get proper instructions from their PARENTS and TEACHERS.

Early advice from competent physicians may save much mental and physical suffering to the victim and innocent persons

Free examination for DIAGNOSIS of these diseases is provided by the State Board of Health at its laboratory. (See law)

Watch future advertisement for more details.

No. 5.

find a whole new publicity world open to you.

You will say: "Here are three newspapers with a total circulation of fifty thousand; they go into every English-reading home in this city. I can purchase a six-inch three-column space once each week for six months for so much money. This will put important health information before practically every family in town twenty-four times. Compared with any other means of accomplishing the same end, the cost of doing this is remarkably small. It is probably less than one tenth what it would cost to reach the same number with circular letters which I have found of limited efficiency. The only question for me to

consider then is: Is it important that the people of this community should receive this information? It is, of course, and the news columns being unavailable, it is wise and expedient for me to spend my money for advertising space through which to convey it to them."

There is, of course, one fundamental difference between social service advertising and commercial advertising, the former actually has nothing to sell. The social service educational campaign is in all its essentials a selling campaign, with the exception that commodities do not change hands and no money comes into the treasury of the social agency by reason of its advertisers.

I am speaking here of purely educational advertising and not advertising for the purpose of raising money. In the latter case the parallel between commercial and social service advertising is almost complete. You are selling an interest in your work for contributions of cash or supplies. The only thing that differentiates your efforts from those of the department store is the fact that your profits are expressed in terms of civic im-

provement, social uplift and humanitarian service, while the profits of the commercial advertisers are expressed in bank balances.

In educational advertising such as most public health agencies would employ, the only return is an enlightened public.

LOWER RATES GRANTED.

Newspapers recognize the difference between social service and commercial

"Bread, Please, for
Our Helpless Friends
So Far Away!"



Copyright, 1918, E. H. Lyman.
HALKA JAN
Homeless Waifs from the "Saddest Land."

The Children of Poland Need Your Help

*They Are Starving and
Freezing to Death*

¶ It is the war's most appalling feature today—the extermination of a nation's young—its very life and hope.

¶ We are trying to save some. We can save many if generous Americans contribute generously at once.

¶ Through these printed words you hear the cries of the Polish children—though they are far away. You see their little hands outstretched.

¶ Surely you will give them bread. For their mothers have nothing to give them but their tears.

¶ Your aid—the little or much that you

can spare—will allay suffering and save lives.

¶ And in some mother-heart there will be a prayer of gratitude for you, the unknown helper in the name of world-wide brotherhood and sisterhood.

*Ah, if beside the dead
Slumbered the pain!
Ah, if the hearts that bled
Slept with the slain!
If the grief died! But no;—
War will not have it so."*

NATIONAL AMERICAN COMMITTEE POLISH VICTIMS' RELIEF FUND

FOUNDED BY IGNACE J. PADEREWSKI.

Hon. WILLIAM M. TAFT (Former Pres. of United States) *Honorary President*
FRANK A. VANDERLIP, (Pres. National City Bank) *Honorary Treasurer*
JAMES M. BECK, (Former Asst. Att'y Gen'l of U.S.) *Chairman Ex. Com.*

AEOLIAN BUILDING, NEW YORK

T-O-D-A-Y spells LIFE

POLISH VICTIMS' RELIEF FUND.

AEOLIAN BLDG., NEW YORK.

I enclose \$..... for food for starving children in Poland.
Please send official receipt.

Name.....

Address.....

Please make checks, etc., payable to "National City Bank for Polish Relief."

Cash contributions to Jan. 15, \$216,825.04. Money is turned into food promptly. Food is not diverted. It reaches and saves the starving. This humanitarian work is entirely non-political and non-sectarian.

A strong appeal for funds in paid for space.

advertising by making substantial reductions in rates for the former. The so-called "charity rate" (a hateful term) is from thirty-five to sixty per cent. lower than the commercial rate. That reduction is based on the same principle that is back of the varying rates for various kinds of advertising. The space is more valuable to certain interests than to others and consequently should demand higher rates.

You will find that advertising has an educational force different from that of any other kind of publicity. It is more nearly equal to the force of the exhibit than anything else. If enough people could be persuaded to view exhibits, that would probably be the most valuable publicity medium.

The newspaper advertisement is comparable to an exhibit in its educational force for three reasons:

1. It tells its story to the people when they are in a frame of mind to listen.

2. It is in a place where people are accustomed to seek information.

3. The space is yours and you can say anything you please subject to certain restrictions as to public decency.

Mr. Truman C. De Weese, Director of Publicity for the Natural Food Company (shredded wheat), has converted a miniature hair mattress into a delectable article of food merely by the use of publicity. In his book, "Practical Publicity," he thus comments on the creative power of advertising.

"Before advertising was developed into a fine art, and before it became a factor in the commercial world, the

business of the manufacturer and merchant was to supply the normal needs and desires of the human family. Merchandising was bounded by man's necessities and by his meager knowledge of the luxuries which he deemed within his reach. Modern advertising has made the luxuries of yesterday the necessities of today. It is something more than a 'drummer' knocking at the door of the consumer—something more than mere salesmanship-on-paper. It is a positive creative force in business. It builds factories, skyscrapers and railroads. It makes two blades of grass grow in the business world where only one grew before. It multiplies human wants and intensifies human desires.

"Advertising is not merely a method of diverting trade away from the merchant or manufacturer who does not advertise. Its function is not merely to pull business away from unprogressive competitors. It has 'news' value as well as psychological power. It not only supplies regular information at stated periods concerning the best and most economical methods of supplying the needs of a normal and comfortable existence, but, operating through well-established psychological laws upon the human mind, it gradually implants in multiplied mentalities the idea that certain things are needed which were never before regarded as necessary to human contentment or happiness. It enlarges and expands the horizon of man's daily life and experience by bringing to his attention new commodities designed for his comfort and convenience without which he would

have been perfectly happy in his ignorance; but, having learned of their existence, he cannot find it in his heart to be happy or contented until he possesses them. It is the constant reiteration of the so-called 'selling arguments' in connection with a product that convinces and finally impels the reader to purchase. The constant dropping of the water of publicity gradually wears away the stone of indifference. The human mind is so constructed that it is appreciably affected by repetition—and, after all, advertising is only repetition.

"The average man was perfectly willing to use an old-fashioned razor all his life. It apparently answered all the necessities of the tonsorial performance. The barber, indeed, still finds it a very satisfactory implement for removing the beards from the faces of his customers. But along

came the advertising man to sow the seeds of dissatisfaction, and now we find safety razors in use by thousands. Men were gradually impressed with the idea that they were behind the times and were unnecessarily depriving themselves of a source of comfort and convenience. In years gone by these same men who have been converted by the safety razor were content to make lather for their faces in shaving mugs. Now, having learned the beauties of the shaving stick, they make their lather on their faces instead of in a mug."

Apply that admirable argument to public health with an open mind and you cannot escape the conviction that health workers have all too long neglected a most important publicity medium, if indeed, not *the* most important one.

A PROPOSED SCORE CARD FOR REFRIGERATORS.

W. A. EVANS, M.D.,
Chicago, Ill.

REFRIGERATORS and iceboxes are sold on appearances. A prospective purchaser finds it practically impossible to get information as to efficiency. He must be guided by the appearance of the box and general statements. As a result a premium is put on appearance, and insulation and other essentials are penalized.

Dr. J. R. Williams has shown that a very large proportion of the refrigerators in use will not properly keep food and are wasteful of ice. Furthermore, he has shown that the construction of many boxes is not such as would indicate that they could be expected to properly keep food or to economize in ice.

The following score card emphasizes efficacy. Such questions as type of construction, kind and amount of insulation are not taken into account except as they register in performance.

The score card can be used by housewives, health departments, food departments, manufacturers and merchants.

The apparatus required consists of ice scales, thermometer, tape line and hygrometer, with each of which every home should be provided. If a hygrometer is not available, a suggestion is made for a shift in the rating.

In preparing this card I have had valuable suggestions from Dr. J. R. Williams of Rochester, New York, and H. C. Gardner of Chicago.

SCORE CARD FOR REFRIGERATORS.

(Front of Card.)

Name of manufacturer.....
 Name or other method of designating refrigerator.....
 Name and address of owner.....

	Perfect.	Allowed.
TEMPERATURE OF FOOD CHAMBER—	45	
Rate as follows:		
40 degrees and under.....	45	
45 ".....	43	
50 ".....	36	
55 ".....	23	
60 ".....	9	
Over 60 ".....	0	
Calculate proper ratings for temperatures between any two of these temperatures rated. Example—To rate 52, subtract 23 from 36. Divide 13 by 5. Multiply $2\frac{3}{5}$ by 2. Add 5 to 23. Rating for 52 is 28.		
ICE ECONOMY—	20	
Rate as follows:		
Heat transmission factor 1.5.....	20	
" " " 2.0.....	18	
" " " 2.5.....	16	
" " " 3.0.....	14	
" " " 4.5.....	11	
" " " 7.0.....	6	
" " " 9 or over.....	0	
Calculate proper rating for a heat transmission factor between any two of these. Example—To rate a heat transmission factor of 4. Subtract 11 from 14. Divide 3 by 3. Multiply 1 by 2. Add 2 to 11. Heat transmission factor rating of 4 is 13.		
For method of estimating heat transmission factor see heading—Ice Economy—on back of card.		
HUMIDITY—	8	
Rate as follows:		
55 to 65.....	8.0	
65 to 75.....	7.5	
45 to 55.....	7.5	
40 to 45.....	7.2	
75 to 80.....	6.4	
30 to 40.....	6.0	
80 to 85.....	4.8	
20 to 30.....	4.8	
85 to 90.....	2.4	
20 and under.....	0	
CIRCULATION OF AIR—	7	
If any wall of the food chamber is moist subtract at least 2. If wall is very wet or more than one wall is moist, subtract at least 4. If air cannot freely travel from ice to food chamber and back again subtract at least 2.		
INTERIOR FINISH—	12	
If ease of cleaning is perfect, value 8.		
If finish is hard and non-absorbent, value 3.		
If color is white, value 1.		

DRAINAGE—		
Proper trapping, value 2.		
Proper drainage pipes, value 1.		
EXTERIOR FINISH—		5
Total		100
Signed—Name.....		
Title.....		
Date.....		

SCORE CARD FOR REFRIGERATORS.

(Back of Card.)

INSTRUCTIONS TO SCORERS.


1. *Temperature Test.* To be entirely fair the refrigerator should be set near the center of a room which is free from drafts and in which the atmospheric temperature is kept at or near 80. The food box should be empty. The food chamber should be cold before the test is begun. The ice chamber should be approximately full. The ice should be in 50 pound cubes. The food chamber should not be opened except to read the temperature. At least four readings at intervals of not less than one hour should be taken and averaged.

A test under actual pantry conditions is reasonably satisfactory. In making a test under pantry conditions credit the refrigerator with a 5 per cent. raise in rating if the temperature of the pantry is between 80 and 90 and a 10 per cent. raise if it is 90 or over. If the inside door of the food chamber is opened oftener than once an hour credit with a 5 per cent. raise in rating.

2. *Ice Economy.* The food chamber should be cold at the beginning of the test. Weigh in the ice at the beginning of the test. Weigh the ice left at the end of the test. For the purposes of the test, the average temperature of the food chamber and of the pantry for the period of the test must be known. Also the number of square feet of the outside surface of the refrigerator.

To get the surface of the refrigerator, measure the front, multiply by 2. Measure one side, multiply by 2. Measure the top, multiply by 2. Add the three products.

Method of determining heat transmission factor:

Number of pounds of ice melted x 142; number of square feet of wall x difference between room temperature and food chamber temperature = heat transmission factor. 

Example: A cheap refrigerator with 39.5 feet of external area maintained a difference of 18 degrees for 24 hours by melting 40 pounds of ice.

$40 \times 142; 39.5 \times 18 = 7.99$ heat transmission factor which gives the box an ice economy rating of 3.2.

3. *Humidity.* In making the humidity test a wet and dry bulb thermometer (hygrometer) is to be used. At least four readings are to be taken at intervals of not less than one hour. The humidities are to be averaged. If the tester is without a hygrometer and cannot test humidity he may add 8, or a proper proportion thereof, to the ratings for circulation of air.

4. *Circulation of Air.* Note whether the food chamber can be ventilated. If it can be, give credit for that fact in ratings. Note whether the cold air flows from the ice to the food and the warmer air from the food to the ice, or the probability of such flow continuously. Credit for efficiency on these points. Note moisture on walls, or of salt placed in food chamber. If the humidity be not taken and the humidity rating be added to circulation of air note especially evidence of condensed moisture on walls.

To demonstrate air currents, place lighted smudge at one or more points in the food chamber and also in the icebox and note the directions of the flow of smoke.

5. *Interior Finish.* Ease of cleaning refers to cleaning of the food chamber, and all shelves therein, the ice chamber and the drain pipes. Credit for removable shelves and rounded corners.

6. *Drainage.* See that the trap in the drain pipe is in working order and that no air can enter the interior through it.

7. *Exterior Finish.* Value on the basis of general appearance.

REPORT OF THE COMMITTEE ON UNIFORM ADMINISTRATIVE ACCOUNTING FOR HEALTH DEPARTMENTS.

DR. HAVEN EMERSON, *Chairman, New York*; DR. WILLIAM C. HANSON, *of the Massachusetts State Department of Health, who resigned before the present report was prepared*; MR. ERNEST C. MEYER, *of the International Health Commission, Washington, D. C.*

Public Health Administration Section, American Public Health Association, Rochester, N. Y., September, 1915.

ORGANIZATION and meeting dates were arranged in February, 1915. The assistance of officers of the New York State Department of Health, the Bureau of Municipal Research of New York City and members of the Advisory Council of the New York City Department of Health was enlisted and their services are gratefully acknowledged by the Committee. Especial appreciation is to be noted for the contributions of Dr. Alexander Brown of the State Department of Health, whose plan of functions and objects was adopted as the basis of this report.

The present statement of the Committee is made in the form of a progress report. It was evident from the beginning that, before any system available for general and uniform application could be adopted, agreement and approval for the functions and schedule of objects to be recorded by department accountants must be obtained.

To this end the Committee and its associates have devoted their meetings during the past six months. The functions of city and state health departments in the United States and Canada were studied and the following is believed to be as nearly as possible a complete list of the activities now carried on by such departments of state or municipal governments. It is not to be at all suggested that the list includes the activities of an ideally organized department of health, nor is it to be understood that the Committee approves of having all the functions here indicated under the jurisdiction of any or all health departments, but the duty which the Committee understands it was created to fill was to provide a common medium for expression by health departments so that they may have a basis for comparison and study of their respective costs.

We suggest that the Functions of Health Departments be divided into sixteen main schedules indicated by numbers I to XVI and that the Objects for which money is spent be divided into twenty schedules indicated by letters A to T.

Under the schedule of most of the functions, it has been thought best to include a sub-heading for supervision, this item representing the duties of the chief of a division or of an office, the staff or superintendent responsible for the particular activity under discussion or what is often included in the item of overhead charges. Also a sub-heading, miscellaneous, has to be inserted in many instances for the sake of including a record of activities and their cost, which may be of only rare or local importance or may be undertaken as experimental activities.

Research as a sub-heading is included in many schedules where it is already accepted as a present activity in some health departments, but it might properly be entered as a sub-heading in every schedule, for progress and development even of the best established public health functions will always depend upon study whether it be in office, field or laboratory.

SCHEDULE OF FUNCTIONS.

I. Administration.

1. Functional executive work. By this is meant the work of adjusting the various parts of the Department organization, and establishing cooperation for the sake of efficiency and economy of the service as a whole, preparing the annual budget, selecting employees.
2. Legal advice and representation.
3. Audit and accounting.

4. Records and reports (other than vital statistics and accounts), such as the weekly, monthly, and annual reports and records of progress of the work of various bureaus.
5. Issuance of licenses and permits.
6. Purchase, storage and distribution of supplies.
7. Administration and upkeep of buildings, and transportation service. By buildings is meant all premises used by the department in its various functions; offices, hospitals, clinics, laboratories. By transportation service is meant the vehicular service under department control or operated by department money, and not the cost of transportation by public carriers, either of person or supplies.
8. Miscellaneous.

II. *Vital Statistics.*

1. Supervision.
2. Keeping and tabulating of records (a) vital (b) mortality (c) morbidity.
3. Transcripts, as of birth and death certificates.
4. Control of disposal of the dead, *i. e.*, in transit, by burial or by cremation.
5. Identification of the dead and verification of the causes of death.
6. Research.
7. Miscellaneous.

III. *Control of Communicable Diseases.*

1. Supervision.
2. Notification and registration.
3. Personal quarantine. By this is meant the various activities directed to the control of the individual sick person or the carrier, *e. g.*, detention of the smallpox patient, or preventing the typhoid carrier from milking cows, or preparing or serving food. Disinfection of persons.
4. Occupancy quarantine. Example: Preventing the occupancy of

buildings where people live, work or assemble when the buildings or premises are infected with rats, where plague is prevalent, or with body lice during a typhus epidemic, or where screening against flies and mosquitoes is not effective to prevent the conveyance of typhoid and malaria or yellow fever. Disinfection of premises.

5. Traffic quarantine. The control of traffic conveyances on land and water together with stations, docks and ferries, the fumigation of ships for rat destruction, the disinfection and cleaning of sleeping cars occupied by the tuberculous.
6. Immunization, as against typhoid and diphtheria.
7. Institutional inspection. Example: Inspection of orphanages and foundling asylums, in order to control measles, whooping-cough, diphtheria and scarlet fever. Inspection of prisons and reformatories to control tuberculosis and venereal diseases.
8. Venereal diseases: Diagnostic and advisory services.
9. Control of diseased animals; examples: Tuberculin testing of cattle; Mallein testing for glanders in horses; diagnosis of rabies and destruction of rabid dogs.
10. Epidemiological studies: Searching for carrier as cause of an epidemic of typhoid; searching out source of typhoid infection of water or milk supply of a town; detecting the carrier of diphtheria in a school class.
11. Research.
12. Miscellaneous.

IV. *Tuberculosis.* (Human) care and prevention of (except isolation and disinfection), which fall under III-2 and 3, or hospital care, which falls under XIV-3.

1. Supervision.

2. Notification and registration.
3. Home visits (by doctors and nurses, or investigations as to economic conditions).
4. Clinics or dispensaries.
5. Day, or day and night camps.
6. Miscellaneous.

V. *Child Hygiene.*

1. Supervision.
2. Prenatal work: Teaching personal hygiene to the expectant mother by doctor and nurses.
3. Supervision of midwives: Examination of applicants, supervision of their practice.
4. Supervision of maternity hospitals and day nurseries.
5. Infant welfare: All activities of welfare stations dealing with child from nursing age to school age.
6. Supervision of boarding out of children: Examination of fitness of women wishing to take infants or children to board and of the premises to be used, and following the health of children so boarded.
7. Supervision of institutions for children: Under this heading are to be included the supervision of the sanitary environment of the children, their hygiene of person, food and exercise and the physical examination of the children, but not the control of communicable disease among the children which falls under III-6.
8. Medical school inspection.
9. Clinics for school children, *e. g.*, trachoma clinics, refraction clinics, etc., for correction of physical defects found on school medical inspection.
10. Employment certificates: Examination of and certification of children of school age who wish to work.
11. Research.
12. Miscellaneous.

VI. *Occupational Disease.*

1. Supervision.
2. Notification and registration.

3. Inspection of premises to prevent industrial hazards.
4. Examination of workers.

VII. *Milk and Milk Products Inspection.*

(This to include control of production and distribution of milk, cream, butter, cheese, condensed milk and ice cream.)

1. Supervision.
2. Barns and cow stables; control of construction, maintenance and occupancy of all places where milch cows are stabled and the scoring of same.
3. Creameries and pasteurizing plants; supervision of equipment and operation.
4. Transportation; Example: Control of icing of milk, time occupied from producer to consumer, vessels used and exposure during transit.
5. Stores: Supervision and scoring of all places used in wholesale and retail trade where these products are marketed.
6. Manufactories: Inspection and control of places where such milk products as butter, cheese, condensed milk and ice cream are made.
7. Miscellaneous.

VIII. *Meat, Fish, Food and Drug Inspection.*

1. Supervision.
2. Meats and fish, supervision of all stages from the slaughtering to the sale of meat of animals and supervision of sale of fish including condemnation of unsuitable meat and fish.
3. Shellfish: Supervision of sources of all oysters, clams, scallops and mussels, the care of them after they are gathered and the manner of marketing them.
4. Fruit and vegetables: Supervision of places of sale and products offered for sale.
5. Public markets: Supervision of their equipment and sanitary condition.

6. Grocery or food stores: Control of equipment, method of holding or exposing food for sale.
 7. Bakeries, candy factories and bakery and confectioners' products: Supervision of premises where such products are made and sold and control of products as offered for sale.
 8. Cold storage: Control of quality of food received, duration of holding, etc.
 9. Hotels and restaurants: Supervision of places where food is cooked and served to the public.
 10. Drugs: Supervision of standards of product and methods of distribution of medicinal agents.
 11. Miscellaneous.
- IX. *Laboratories: Chemical, Physical and Bacteriological.*
1. Supervision.
 2. Analytical: Examination of water, air and drugs.
 3. Diagnostic: Examination of sputum, blood, spinal fluid.
 4. Therapeutic: Preparation and testing of products to be used in the medicinal or biological treatment of disease.
 5. Research.
 6. Miscellaneous.
- X. *Public Health Education.*
1. Supervision.
 2. Department publications, monographs, periodicals and special articles.
 3. Newspaper publicity: Interviews, text for press bulletins.
 4. Lectures: Read or delivered.
 5. Exhibits: Fixed or traveling.
 6. Miscellaneous.
- XI. *Control of Nuisances.*
1. Supervision.
 2. Privies: Control of construction, operation and maintenance.
 3. Disposal of private sewage and industrial wastes.
 4. Carcass removal: Control of collection and final disposition.
 5. Insect extermination: Draining and oiling for mosquito exter-

mination; anopheles surveys; destruction of flies and eliminating their breeding and feeding places.

6. Rat extermination: Rat proofing, rat catching and poisoning.
7. Spitting: Search for and arrest of offenders.
8. Common utensils: Towels, cups, forks, preventing their common use.

The preceding sub-headings may properly be grouped as productive measures directed to the prevention of communicable disease transmitted by means of the nuisances specified. The remaining headings deal with nuisances less directly concerned with the actual causation of disease.

9. Offensive trades: Limiting their location, controlling their operation to eliminate offense to smell.
10. Garbage and refuse removal: Control of method of collection, transportation and final disposal.
11. Smoke prevention: Control of escape of smoke, soot, dust and the fumes and other air-borne impurities of industry.
12. Noise prevention.
13. Offensive weeds: The destruction of poisonous or noisome weeds such as poison ivy and ragweed.
14. Miscellaneous.

- XII. *Building Inspection.* All building inspection from the health standpoint may be understood to deal with the construction of the building, to insure a suitable fixed environment and the use of the building when constructed. These being functions not always served by the same department of government and in some instances not by health departments, it is necessary to subdivide the inspection of the various kinds of buildings into inspection for construction, such as the details of tenements and cow stables and inspection for occupancy as factories and lodging houses.
1. Supervision.

2. Schools.
 - a. Construction
 - b. Occupancy
 3. Factories.
 - a. Construction
 - b. Occupancy
 4. Lodging Houses.
 - a. Construction
 - b. Occupancy
 5. Theatres.
 - a. Construction
 - b. Occupancy
 6. Public buildings.
 - a. Construction
 - b. Occupancy
 7. Tenements.
 - a. Construction
 - b. Occupancy
 8. Baths and Laundries.
 - a. Construction
 - b. Occupancy
 9. Hospitals.
 - a. Construction
 - b. Occupancy
 10. Public Conveyances (except for quarantine which falls under III-4).
 - a. Construction
 - b. Occupancy
 11. Mines.
 - a. Construction
 - b. Occupancy
 12. Labor Camps.
 - a. Construction
 - b. Occupancy
 13. Other Buildings (Miscellaneous).
- XIII. *Water Supply and Sewage Disposal.*
1. Supervision.
 2. Public water supply: Its protection and purification.
 3. Private water supply: Protection and purification.
 4. Sewage disposal (all except private sewage included under XI, 2 and 3).
 5. Miscellaneous (privies unless involving engineering problems to be considered under control of nuisances).
- XIV. *Hospitals and Dispensaries.*
1. Supervision.
 2. Hospitals for communicable diseases.
 3. Hospitals for tuberculosis.
 4. Hospitals for venereal diseases.
 5. Hospitals and clinics for treatment of special conditions such as trachoma, hookworm, whooping-cough.
 6. Lying-in hospitals.
 7. Foundling hospitals.
 8. General medical and surgical hospitals.
 9. Hospitals for alcoholics and drug addicts.
 10. Hospitals for the insane.
- XV. *Operation of Public Conveniences.*
1. Supervision.
 2. Public comfort stations.
 3. Public baths.
 4. Miscellaneous.
- XVI. *Miscellaneous Activities not Included in Previous Headings.*
- SCHEDULE OF OBJECTS.
- A. Salaries.
 - B. Fees.
 - C. Rent, taxes, insurance, repairs.
 - D. Heat, light, power.
 - E. Telephone, telegraph and postage.
 - F. Local transportation, vehicular and carfares.
 - G. Transportation, other than local.
 - H. Shipping.
 - I. Printing.
 - J. Exhibits.
 - K. Legal expenses.
 - L. Office supplies and furniture.
 - M. Scientific materials and supplies.
 - N. Drugs and chemicals.
 - O. Sera and vaccines.
 - P. Books and periodicals.
 - Q. Fuel.
 - R. Food.
 - S. Clothing.
 - T. Miscellaneous.

Since the presentation of this report, the Committee has continued its work with such success that the Bureau of the Census is likely to issue a pamphlet summarizing the results of its labor. Experimental application of the proposed schedule is being made under the direction of the Bureau of the Census.

The Committee would be grateful for critical comments and constructive suggestions from any or all health officers. Communications should be addressed to the Chairman of the Committee at 159 Centre street, New York City.

REPORT OF THE COMMITTEE ON STANDARD METHODS OF PREPARING DIPHTHERIA ANTITOXIN.

Committee, P. G. HEINEMANN, DR. J. F. ANDERSON, DR. W. H. PARK, A. PARKER
HITCHENS, DR. H. D. PEASE.

Presented before the Laboratory Section of the American Public Health Association, Rochester, N. Y.,
September 9, 1915.

THE Committee on Standard Methods of Preparing Diphtheria Antitoxin reported fully to the Association four years ago. During this period some progress has been made and for this reason a supplementary report is submitted.

Injections.—In some laboratories injections are made at shorter intervals than heretofore with the object of reaching the stage of productiveness in a shorter time. The amount injected is increased rapidly. Close observation of the horses will show whether the increase is too great. By this procedure the productive period may be reached in six to eight weeks. Antitoxin is given with the first dose or before. It is advocated by some to inject a given dose in a large number of places rather than give larger amounts in few places.

The treatment of abscesses seems to meet with some difficulties. Sterilizing the skin with tincture of iodine and again painting iodine over the needle hole seems to have good effect.

Where the blood is defibrinated special care has to be exercised to avoid contaminations.

Horses.—Doctor Anderson proposes application of the Römer test before immunization as this might be of assistance in selecting suitable horses.

Preparing Toxin.—Imported pepton

is not on the market at present. In some laboratories domestic pepton has been used. It would be interesting to learn the results. On the whole, domestic pepton does not seem to yield toxins of as high potency as Witte pepton.

Refining and Concentrating the Serum.—Doctor Banzhaf's latest method is given as follows: The citrated plasma is diluted with one half its volume of water and saturated ammonium sulphate solution up to 30 per cent. saturation, *i. e.*, 7 ccm. of diluted plasma to 3 ccm. of saturated ammonium sulphate solution. The diluted plasma containing 30 per cent. saturated ammonium sulphate solution is heated to 60° C. in a water bath. The water is kept at 66° C. The length of time to heat the plasma ammonium sulphate solution up to 60° should take about two hours for the best results. It is essential to keep the pots covered during the heating to prevent loss of water by evaporation. It is also essential to stir the mixture frequently to insure uniform heating. When the mixture reaches 60° C. it is held at this temperature for about 15 minutes. The contents are filtered immediately. The precipitate containing the fibrin and euglobulin, although filtration has practically ceased, will retain considerable of the fluid which contains anti-

toxin. This fluid can be reclaimed by several methods. A practicable method is to press the precipitate in the same manner as the final precipitate of pseudoglobulin is pressed, but in this case catching the fluid pressed out. Another method of reclaiming the fluid from the precipitate is to add water containing 34 per cent. ammonium sulphate solution to the funnels containing the precipitates, thereby washing them. A more thorough manner would be to place the precipitates in the water containing the ammonium sulphate, mixing the whole well and refiltering. The resulting filtrate is then added to the main filtrate. The amount of saturated solu-

tion of ammonium sulphate in the combined filtrates may be regarded as 30 per cent. Sufficient saturated ammonium sulphate solution is added to raise the contents of the combined filtrates from 30 per cent. to 50 per cent. The resulting precipitate will contain the antitoxin. The precipitate is pressed and then dialyzed until free from ammonium sulphate. Trik-resol is added to the finished product in the proportion of 0.3 to 0.4 per cent.

(Signed)

P. G. HEINEMANN, *Chairman.*

J. F. ANDERSON,

W. H. PARK,

A. PARKER HITCHENS,

H. D. PEASE.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE regular quarterly meeting of the Massachusetts Association of Boards of Health was held at the Brunswick Hotel, Boston, Thursday, April 27, 1916.

In the absence of the President, Dr. Frank A. Woods, the meeting was presided over by the first Vice-President, Dr. Francis X. Mahoney.

It was unanimously voted to accept the following applicants as members of the Association: J. Arthur Baker, 24 North St., Pittsfield; Timothy A. Butler, 497 Blue Hill Ave., Roxbury; Dr. R. D. Canedy, Board of Health, No. Adams; Bernard W. Carey, 4 Prichard St., Fitchburg; Dr. S. B. Grubbs, U. S. P. H. Service, Gallops Island, Boston; C. W. Horton, Health Officer, Swampscott; Dr. A. H. Mandell, 25 Sycamore St., New Bedford; Dr. Stanley H. Osborne, Elmwood Ave., No. Adams; John J. Pearson, Board of Health, Middleboro, Herbert S. Riley, Board of Health, Woburn; Dr. F. A. Robinson, Board of Health, Middleboro; Dr. M. V. Safford, U. S. P. H. Service, Long Wharf, Boston; J. H. Wheeler, Board of Health, Middleboro; Mr. Frederick Woods, Washington St., Wellesley.

It was announced that the Executive Committee had accepted an invitation from the Board of Commissioners of the Providence City Hospital

to hold the July meeting of the Association in that city.

It was voted, on recommendation of the Executive Committee, that the Legislative Committee of this Association appear before the trustees of the State Hospitals for Consumptives to oppose any contemplated action for refusing care at State Sanatoria to advanced State cases of tuberculosis.

The following program was then presented:

Paper—Home Rule in Public Health, by Dr. Francis Geo. Curtis of Newton.

Paper—Legislative Measures of the Present General Court of Interest to Public Health Workers, by Dr. Geo. L. Tobey of Clinton.

Discussion on these papers was opened by Dr. F. G. Wheatley of No. Abington.

Discussion on the Report of the Committee for Standardization of Local Health Regulations was opened by Mr. Robert N. Hoyt of Manchester, N. H.

It was voted to recommend the following regulations for the control of communicable diseases.

It was voted to accept the progress report of the Committee on Standardization of Local Health Regulations for the Section on Communicable Diseases as follows:

PROGRESS REPORT.

COMMITTEE ON STANDARDIZATION OF LOCAL HEALTH REGULATIONS.

SECTION ON COMMUNICABLE DISEASES.

MINIMUM RULES FOR COMMUNICABLE DISEASES.

QUARANTINE. The term quarantine as used in these rules shall be understood to mean that persons in the dwelling, tenement, apartment or other quarters under restriction shall not leave said premises, and that all other persons save the physician, nurse, clergyman and authorized health officers shall not enter such premises, except upon permission of the local health authorities.

ISOLATION. The term isolation as used in these rules shall be understood to mean the restraint of the patient and nurse or other attendants to a certain room or rooms apart from other members of the household in a manner satisfactory to the local health authorities.

HOUSEHOLDER. The term householder as used in these rules shall be understood as meaning the head of the household, or the one in charge of the household, or the one in charge of a hospital, asylum, prison, jail, school or institution, public or private.

TENEMENT OR APARTMENT. The term tenement or apartment as used in these rules shall be understood to mean the room or rooms or portion of a building used as residence by a single family or household.

DISINFECTION. The term, applied to premises, as used in these rules shall be understood to mean the cleansing, renovation and airing of the same, following the presence of cases of communicable diseases, and such additional measures as may be required by the local health authorities.

QUARANTINE AS APPLIED TO TENEMENTS.

In a house containing one or more tenements or apartments, where each apartment has a separate exit, quarantine applies to a single tenement.

In a house containing one or more tenements, where there is a common entrance hall together

with an individual exit, quarantine applies to a single tenement.

NOTE.—Under the foregoing school children from other tenements may continue at school in the discretion of the local health authorities.

In a house containing one or more tenements, all using a common entrance or exit, quarantine may apply to the whole building according to the discretion of the local health authorities.

School children from such apartment or tenement house shall be detained from school at the discretion of the local health authorities.

I. REPORTING DISEASES.

(1) *Diseases Which Must Be Reported.*

The following diseases have been declared by the State Department of Health to be dangerous to the public health and therefore must be reported to the Board of Health.

Actinomycosis
 Anthrax
 Anterior Poliomyelitis (Infantile paralysis)
 Asiatic Cholera
 Chicken Pox
 Diphtheria
 Dog-Bite (Requiring anti-rabic treatment)
 Dysentery:
 (a) Amebic
 (b) Bacillary
 Epidemic Cerebro-Spinal Meningitis
 German Measles
 Glanders
 Hookworm Disease
 Infectious Diseases of the Eye:
 (a) Ophthalmia Neonatorum (inflammation of the eyes of the new-born)
 (b) Suppurative Conjunctivitis
 (c) Trachoma
 Leprosy
 Malaria
 Measles
 Mumps
 Pellagra

Plague
 Rabies (Hydrophobia)
 Scarlet Fever
 Septic Sore Throat
 Smallpox
 Tetanus (Lock jaw)
 Trichinosis
 Tuberculosis (all forms)
 Typhoid Fever
 Typhus Fever
 Whooping-Cough
 Yellow Fever

(2) *Physicians Must Report Diseases.*

When a physician knows that a person whom he is called to visit is infected with a disease dangerous to the public health, he shall immediately give notice thereof in writing over his own signature to the Board of Health.—R. L. 75, Sec. 50.

NOTE.—It is recommended that in all cases of scarlet fever, diphtheria and smallpox and in cases of typhoid fever or septic sore throat when occurring in the household of any person engaged in the production, transportation or handling of milk, or when presumably caused by the consumption of infected milk, the written report shall, when practical, be preceded by an immediate telephone report to the Board of Health.

(3) *Householders Must Report Diseases.*

A householder who knows that a person in his family or house is sick with a disease dangerous to the public health shall forthwith give notice thereof to the Board of Health.—R. L. 75, Sec. 49.

II. ISOLATION AND SICK ROOM REGULATIONS.

(4) *Duration of Isolation.*

Isolation and quarantine shall continue until release by the Board of Health.

The minimum period of isolation or quarantine of a person having any of the following diseases (reckoned from the date when the notice of such disease is mailed) shall be as follows:

Diphtheria: Until two successive, negative cultures, taken from both nose and throat at least 24 hours apart have been obtained.

Scarlet Fever: Twenty-eight days and thereafter until discharges from nose and throat, ear or abscesses, cease.

Contacts shall be kept under observation till eight days from last exposure.

Measles: Till 10 days from onset of the disease.

Contacts shall be kept under close observation till 14 days from last exposure, unless known definitely to be immunized by previous attack.

Whooping-Cough: Subject to isolation for 3 weeks from date of report, and thereafter till characteristic whoop ceases.

Contacts till 14 days after last exposure.

Mumps: Till 3 weeks from report of disease; contacts till three weeks from last exposure.

Chicken Pox: Till skin and mucous membranes are normal.

Contacts till 3 weeks after last exposure.

Smallpox: Fourteen days, and until scabs are gone and skin is healed.

Contacts, till 21 days after last exposure, unless properly protected by recent successful vaccination.

Typhoid Fever: All persons recovering from typhoid fever should be instructed that they are a possible danger to the community and given the necessary information as to methods to be pursued by them to make that danger as little as possible.

German Measles: Contacts, till seven days from last exposure.

III. EXPOSED PERSONS.

(5) *Maximum Incubation Periods.*

Persons who have been exposed to diseases dangerous to the public health shall be deemed to be in danger of contracting such diseases unless immunized by an attack or by vaccines or unless free from symptoms of the disease during the following longest common incubation periods after the latest exposure:

Diphtheria: 8 days.

Scarlet Fever: 8 days.

Smallpox: 21 days.

Anterior Poliomyelitis: 14 days.

Chicken Pox: 21 days.

Measles: 14 days.

Mumps: 21 days.

Whooping-Cough: 14 days.

NOTE.—It is recommended that persons who have been exposed to diphtheria, scarlet fever or smallpox be under observation during the above incubation periods.

IV. EXCLUSION FROM SCHOOL.

(6) *Children Should be Detained from School During Quarantine and Isolation Periods.*

Contacts should be detained from school, following last exposure, for a period corresponding to the incubation periods of the different diseases.

Readmission to school should depend upon presentation of a certificate from the local health authorities, or from the attending physician bearing the approval of the local health authorities.

V. QUARANTINE.

(7) *Placarding of Dwellings.*

The Board of Health shall give warning of the existence of each of the following diseases by posting a placard bearing the name of the disease near one or more of the entrances to the dwelling, apartment or room in which such case is located. Anterior Poliomyelitis (Infantile paralysis).

Diphtheria.

Measles.

Scarlet Fever.

Smallpox.

Whooping-Cough.

The Board of Health shall give such warning of other diseases dangerous to the public health as shall be necessary for the protection of the public or as shall be required by law.

No person shall, without permission of the Board of Health, remove, obliterate or deface such placard, and the responsible head of the household shall immediately notify the Board of Health in the event of the removal, obliteration or defacement of such placard.

(8) *Milk Bottles.*

No milk bottles shall be removed from a house in which there is or has been a case of diphtheria, scarlet fever or typhoid fever without permission of the Board of Health.

(9) *Public Libraries.*

There shall be no interchange of books between libraries and quarantined households.

(10) *Public Funerals Forbidden in Certain Cases.*

No public funerals shall be held of any person

who has died of diphtheria, scarlet fever or smallpox.

NOTE.—The purpose of this regulation is to prevent the spread of disease by the living members of the deceased's household who may be convalescent from the disease or who may have the disease in a mild or unrecognized form.

(11) *Exclusion From Business.*

No person shall engage in the handling of milk or food nor in an occupation bringing him into close contact with children after exposure to or while residing in a household in which there is a case of scarlet fever, diphtheria, typhoid fever or smallpox without permission from the Board of Health.

Other persons may be required to remove from the dwelling or to abandon their occupations if the nature of the isolation of the patient or the amount of contact occurring in the occupation are held by the Board of Health to require such action.

VI. TUBERCULOSIS.

(12) *Disposal of Sputum.*

Every person suffering from tuberculosis shall dispose of his sputum in a manner which shall not endanger the public health.

(13) *Notice of Removal.*

Whenever a person with tuberculosis changes his residence, the attending physician, if there be one, or the active head of the household in which the patient resides forthwith shall notify the Board of Health of the change and both of the above mentioned persons shall be held legally responsible for the violation of this order.

Committee on Standard Local Health Regulations.

Clarence J. Allen, M. D., Winchester.

John A. Cook, Provincetown.

Edward Guild, M. D., Springfield.

Frederic W. Howe, Framingham.

L. A. Jones, M. D., State Health Officer.

Frank W. Jackson, Brockton.

George T. Lennon, Haverhill.

David J. O'Connell, Esq., North Easton.

Robert N. Hoyt, Wellesley, Chairman.

HOME RULE IN PUBLIC HEALTH WORK.

FRANCIS GEO. CURTIS, M. D.,
Chairman, Newton Board of Health.

Read before the Massachusetts Association Boards of Health, Boston, Mass., April 27, 1916.

UNLIKE many of the other states of the Union, Massachusetts has put the control of almost all matters pertaining to public health in the hands of the local boards of health, making them practically paramount within the borders of their own communities, and leaving the State Department of Health to act in an auxiliary and educational capacity.

Only along certain lines, which are specifically referred to in the public statutes, has the State Department of Health power to compel a local board to act, against its will, in matters strictly affecting its own community.

The State Board of Health, as it was then called, was created by Chapter 420 of the Acts of 1839, and Section 2 of that chapter, which defines the duties of the newly created board, says: "The board shall take cognizance of the interests of health and life among the citizens of this Commonwealth. They shall make sanitary investigations and inquiries in respect to the people, the causes of disease, and especially of epidemics and the sources of mortality and effects of localities, employments, conditions and circumstances upon the public health, and they shall gather such information in respect to those matters as they may deem proper, for diffusion among the people."

This law still remains upon the

statute books as Section 4 of Chapter 75 of the Revised Laws, as amended by Chapter 480 of the Acts of 1903 and further amended by Chapter 104 of the Acts of 1912.

Some additions due to changed times have been put in but it remains practically the same and clearly defines the duties of the Board as advisory and educational. In the original law this was made even clearer by the introduction of a comma between the words "deem proper" and "for diffusion among" showing clearly that the reason for the gathering of the information was for diffusion among the people, that is educational.

Ten years later the State Board of Health was abolished by Chapter 291 of the Acts of 1879, and the State Board of Health, Lunacy and Charity was established in its stead. Section 3 of that Chapter provides that the newly established board "shall have all the powers and duties and may exercise all the functions of the boards abolished by section one hereof. . . ." Section 6 provides that the board shall exercise certain new functions, and exists today as Section 8 of Chapter 75 of the Revised Laws as amended by Chapter 670 of the Acts of 1913.

This section says: "If smallpox or any other contagious or infectious disease declared by the State Board of Health to be dangerous to the public health exists or is likely to exist in any

place within the commonwealth, the state board shall make an investigation thereof and of the means of preventing the spread of the disease, *and shall consult thereon with the local authorities.* It shall have coördinate powers as a board of health, in every city and town or with the mayor and aldermen of a city or the selectmen of a town in which there is no such board." Later on in the same section the state board may "require" local boards of health to give notice of cases of any disease dangerous to the public health.

At first glance it seems as if the phrase "It shall have coördinate powers as a board of health" gave independent power to the State Board but when taken with the statement made earlier in the section that it "shall consult thereon with the local authorities," it seems clearly to mean simply that the State Board is put on an equality with the local boards, so that it can consult, as an equal, with them "if smallpox or other . . . disease . . . exists," but gives it no authority over them. Furthermore, whatever it means, it applies only to localities in which smallpox or other diseases dangerous to the public health exist and only to methods of the prevention of the spread of such diseases and to nothing else.

Seven years later by Chapter 101 of the Acts of 1886 the State Board of Health was reëstablished and continued in existence until the present State Department of Health was created by Chapter 792 of the Acts of 1914.

It is natural that in the twenty-eight years which elapsed between the

reëstablishment of the old State Board of Health and its abolishment, many statutes bearing upon public health matters and upon the relation of the state to the local authorities should have been passed but the principle of home rule in local affairs seems to have been kept in view always.

In Section 2 of Chapter 792 of the Acts of 1914 which in a way defines the duties and powers of the state commissioner of health, this principle seems to be reaffirmed in the last sentence of the section which says: "He may direct any executive officer or employee of the state department of health *to assist* in the study, suppression and prevention of disease in any part of the commonwealth."

In Section 5, there is a sentence which seems to give more power to the State Department, but I think it is more apparent than real. It is as follows: "The commissioner of health may, from time to time, order two or more of said district health officers to work in one district in order to study, suppress or prevent disease." The section continues; "Each district health officer shall have all the powers and perform the duties now provided by law for inspectors of health and further shall, under the direction of the commissioner"—do certain things, and "shall secure the enforcement within his district of the public health laws and regulations."

When we look to see what the duties of the district health officers may be, we find that by Section 3 of Chapter 537 of the Acts of 1907, every state inspector of health shall among other things "disseminate knowledge as to

the best methods of preventing the spread of such diseases, and shall take such steps as, after consultation with the state board of health and the local state authorities, shall be deemed advisable for their eradication."

Even in the so-called "Big" Milk Bill presented to this year's legislature, the State Department of Health has no power to act unless the local boards of health fail to do their duty, or being unable for certain reasons to do it, ask the state to act for them. Then, and not till then, can the State Department act in a matter directly affecting a local community.

There are, of course, certain functions which affect the whole state, and certain others in which the State Department with its larger detail of force can act more economically and more effectively than the local boards, and in these the law allows or directs it to act.

Thus the State Department of Health has general oversight of inland waters and streams and ponds used as sources of water supply, but even in such cases this does not in any way limit the power of the local board to act in order to prevent pollution. Later on in the same statute the State Department is directed to consult with the authorities of cities and towns and advise with them in regard to their water supply.

The supervision and licensing of cold storage plants is put in the hands of the State Board of Health by Chapter 652 of the Acts of 1912, but by Chapter 640 of the Acts of 1910, boards of health of cities and towns are directed to make frequent inspections

of all cold storage plants, presumably within their own jurisdiction.

In many instances where the supervision of the same thing is given to the State Department of Health and to the local board, there may arise a question as to which board has the authority to act and enforce its orders, when these orders may differ. I have been able to find but one ruling on this matter, but as far as it goes it seems to settle the question in favor of the local boards.

In the case of the *Commonwealth v. Prince*, quoted in 203 Mass. 602, a local inspector of slaughtering who was ready to pass a carcass, condemned it at the behest of a state inspector, but afterwards returned to his original opinion and passed it. The state moved against the vendor and in the superior court the judge ordered a verdict of guilty against the defendant. The case went to the Supreme Court on exceptions, which were upheld. The comment on the decision says: "It seems that an inspector appointed by the state board of health under R. L., C. 75, Sect. 5, has no right to displace an inspector appointed by a municipal board of health under Sect. 102 of the same Chapter, who in the performance of his duty is engaged in the careful examination of carcasses at a slaughter house under the rules of the board of cattle commissioners and in stamping with an official stamp, a carcass which he is of opinion is wholesome and fit for food."

A member of the board of health of a town, appointed under R. L., C. 75, Sect. 102, by the board of which he was a member, to carefully examine under

the rules and regulations of the board of cattle commissioners the carcasses of animals slaughtered at a certain slaughter house, to stamp with an official stamp carcasses which he determined to be wholesome and to seize and cause to be destroyed any carcass which he determined to be unwholesome or unfit for food, was of the opinion that the carcass of a certain cow was wholesome and was prepared to stamp it when an inspector of the State Board of Health after an examination, being of opinion that the carcass was unwholesome, "declared the meat condemned," and at his request the inspector for the municipal board of health attached red tags to the carcass, signifying that it was condemned. After the inspector for the State Board had departed, the local inspector and one other member of the municipal board, the two forming a majority of the local board, made a careful examination of the carcass and declared it to be healthy and fit for food, and the local inspector thereupon removed the red tags and stamped the meat with the official stamp of approval. The meat was fit for human food. The owner sold the meat, and was arrested upon a complaint which charged that he "did knowingly sell for food a carcass . . . condemned as diseased by an authorized agent of the (State) Board of Health, said carcass being unfit for food by reason of disease." At the trial of the complaint in the Superior Court on appeal from a district court, the foregoing facts being admitted, the presiding judge ordered a verdict of guilty, and the defendant alleged exceptions.

Held, that the local inspector at no time was ousted from his jurisdiction to determine whether to approve and stamp the carcass as fit for food, that therefore the sale by the defendant was justified, and that the defendant's exceptions must be sustained.

This seems to show that the local board of health is more powerful than the State Board of Health, provided that it is exercising its powers within the law.

We come now to the local boards of health and the functions which they exercise.

First and foremost comes the control of diseases dangerous to the public health. The State Department of Health, by statute, may declare what diseases are dangerous to the public health and as such come under the control of the local board, but over the methods of control it has little or no power. The local board can and does make its own rules for the care of such cases; it fixes its own method of isolation, fixes the length of the isolation, the method of release, the measures to be taken after release and practically everything connected with the management of the sick person and the members of the family. It can decide when a child may return to school after recovery from such a disease and it may even permit children in a family where such disease exists to continue at school if it sees fit. (R. L., C. 44, Sect. 6, as amended by C. 371, Acts of 1906, and further amended by C. 215, Acts of 1907.)

There is one disease over which it has apparently less control than others and that is tuberculosis, and even in

this it seems to the ordinary layman that the law gives the same power as it does in other diseases, but in actual practice it is found difficult to enforce its power.

The control of the local board over the sources of supply of the milk sold within its jurisdiction is practically absolute under Chapter 744 of the Acts of 1914 and it not only can, but, if it obeys the law, it must carry this supervision and control not only beyond the borders of its own municipality but beyond the borders of Massachusetts and in some cases even outside of the limits of the United States. By the provisions of this statute a local board of health in Massachusetts can enforce its orders in Canada!

Its power under the Statute in regard to nuisances (R. L., C. 75, Sect. 65) is almost unlimited and extends in many directions, and by a decision of the court (*Stone v. Heath*, 179 Mass. 385), the declaration of a local board of health that a nuisance exists will not be reviewed by the court until the orders of the local board have been carried out.

Under this section, according to an opinion of the Attorney General, a board of health may examine the children in a school if it has reasonable ground for the belief that cases of sickness (presumably of a disease dangerous to the public health) exist in such school. The opinion does not say to what extent the examination may be carried.

Another example of the power of a local board of health is shown in the decision in the case of *Newton v. Joyce*,

quoted in 166 Mass. 83. In this case the board refused to grant a license for the use of a stable, ordered its use discontinued and applied for an injunction, to compel obedience to its order. The defendant claimed that the statute was unconstitutional because it deprived him of the use of his property without compensation, and gave no right of appeal from the decision of the board on the question of whether a license should be granted. The Supreme Court held among other things, that the law "is constitutional, although no provision is made for compensation to the owner and no right of appeal is given from the local authorities to whom the Legislature has seen fit to intrust the determination of the question."

Instances of the more or less absolute control of local boards of health over all matters affecting the public health within the borders of their own municipalities might be multiplied, but enough have been mentioned to show that they are practically paramount in such matters.

Massachusetts has shown her wisdom in thus placing this power and responsibility in the hands of the local boards, for it is self-evident that they are far better fitted to deal with local matters than the State Department of Health can possibly be.

It is no part of the duties of a state department to interfere in municipal matters, because, and I say it with due deference to the State Department of Health, it has not the intimate knowledge of local conditions to enable it to act intelligently.

It would be impossible, for instance

for the State Department of Health to draw up a system of rules that would be applicable to the cities of Boston and North Adams or to the towns of Brookline and Munroe Bridge.

Local conditions differ so greatly that it requires men absolutely familiar with such conditions to act intelligently. This fact was clearly shown, after the consolidation of greater New York, when an attempt was made to enforce in the Borough of Richmond, a semi-rural community, the rules made for the Borough of Manhattan.

It is perfectly proper for the State Department to lay down broad general principles for the assistance and guidance of local boards, but all the details of working them out and applying them to local needs should be left to the local boards themselves.

Furthermore, a local board is a much more elastic body than the State Department, and can settle the particular questions which may arise in its own locality, more promptly and usually more efficiently than can the State Department.

The State Department of Health and the local boards are reciprocating parts of the great machine for the protection of the public health; each has its own work to do.

The State Department can and does assist the local boards by furnishing information in regard to public health matters, and also the means of combating disease, which its larger personnel and greater facilities enable it to obtain, while the local boards, taking the general information furnished them by the State Department, use it as a basis for working out their own problems in their own way.

It appears, therefore, that the chief power over all matters of public health in their own communities lies in the hands of the local boards, and this being so, certain responsibilities, which may not be lightly laid aside, rest upon these same local boards.

The Legislature, in its wisdom, has ordained that every community in the Commonwealth shall have a body of men to care for the health of its citizens by decreeing that every municipality shall have a board of health either as a separate entity or as a function of the governing body. But, whether there is a separate board of health or whether the governing body acts as a board of health, when necessary, the power which the Legislature has given to boards of health rests in their hands and makes the members of a local board of health the most powerful body of men in the municipality. This power is given to them simply and solely for the protection of the health of the communities which they serve, and, if they fail to act in such matters to the best of their ability they are derelict in their duty.

It is a sad fact that many boards of health are thus derelict, for they exist in name only and do nothing to justify their existence. Every board of health should seriously consider the responsibility which rests upon it and resolve that it will take up the work which devolves upon it to the best of its ability, for if this is done we shall hear less of communities which do nothing along the lines of public health work, and there will be no excuse for any attempt to lessen the authority which the local boards now have over matters which affect their own communities.

LEGISLATIVE MEASURES OF THE PRESENT GENERAL COURT OF INTEREST TO PUBLIC HEALTH WORKERS.

DR. GEORGE L. TOBEY,
Clinton, Mass.

Read before the Massachusetts Association of Boards of Health, Boston, Mass., April 27, 1916.

THERE were a number of measures that were of interest to public health workers, but the time limit necessitates the selection of a few of the more important measures.

MEASURES RELATIVE TO TUBERCULOSIS.

Senate Bill 326, relative to the claims of cities and towns for the care of tuberculosis cases, was signed March 21, and is now Ch. 57 of the General Acts. This Act provides that: Every city or town which places its patients suffering from tuberculosis in a municipal or incorporated tuberculosis hospital in this commonwealth, or in a building or ward set apart by a municipal or incorporated hospital in this commonwealth, for patients suffering from tuberculosis, shall be entitled to receive from the commonwealth a subsidy of five dollars a week for each patient who is unable to pay for his support, or whose kindred, bound by law to maintain him, are unable to pay for the same; but a city or town shall not become entitled to this subsidy unless, upon examination, authorized by the trustees of hospitals for consumptives, the sputum of such patients is found to contain bacilli of tuberculosis, or unless the hospital building or ward is approved by said trustees, who shall not give such ap-

proval unless they have by authority of law, or by permission of the hospital to inspect the same at all times. It also provides that the trustees shall not approve claims for subsidy hereunder for more than thirty days prior to the date when notice is mailed to said trustees that a subsidy in any given case is claimed. Also that they may at any time withdraw their approval.

House bill 1983, providing for an investigation by the State Department of Health of non-pulmonary tuberculosis, has passed to be engrossed in both House and Senate.

This bill provides: That the State department of health is hereby authorized and directed to investigate the problem of non-pulmonary tuberculosis with special reference to children and adolescents throughout the commonwealth. To determine the existing number of cases of non-pulmonary tuberculosis and their location throughout the commonwealth. Also the number of hospital beds now available for the care of such cases, and the number of additional hospital beds needed for the proper care and treatment of such cases, and the proper location of such beds. And whether such additional beds, if needed, should be supplied by additions to or enlargements of existing general or other

hospitals, or by providing new institutions designed for the purpose of treating non-pulmonary tuberculosis cases exclusively. It provides that said department may hold such public or private hearings as it may deem proper during the course of such investigation, and shall submit a report to the next general court.

REGISTRATION OF PHYSICIANS BY BOARD OF REGISTRATION IN MEDICINE.

In its Annual Report, the Board of Registration in Medicine recommends a change in the law affecting the registration of physicians, which would require applicants for registration to furnish evidence that they had received the decree of Doctor of Medicine or its equivalent from a legally chartered medical school, approved by the Board of Registration in Medicine; the change in the existing law being the requirement that the medical school should be one approved by the Board. They also recommended that they give to the Board the right, after hearing by unanimous vote to revoke any certificate issued by it, and cancel the registration of any physician who had been found, after an investigation by the Board, to have been associated either as principal or assistant in carrying on the work of a physician with an non-registered practitioner of medicine who for hire engages in the work of a physician. These recommendations were both incorporated in House Bill No. 406, and were strongly opposed by the friends of certain schools and others. The Committee on Public Health reported no legisla-

tion upon these recommendations, which report was accepted by both branches of the Legislature.

HERBAL DOCTORS.

A bill providing for the licensing by the Board of Registration in Medicine of persons desiring to engage in the business of selling, prescribing and administering of natural herbs, which bill was commonly referred to as the Chinese Doctor's Bill, was heard before the Public Health Committee on two separate days and was reported in the Senate with leave to withdraw, which report was first accepted by the Senate, but such action was afterward reconsidered and bill substituted for the adverse report. This bill would seem to open the way for practice under authority of the State, of a large number of persons who have not the training required of physicians. It is being urged particularly in behalf of a well known Chinaman. This bill, fortunately, was later killed in the house,

ANTI-VACCINATION BILL.

The usual effort to enact legislation to allow the attendance at public schools of unvaccinated children was made again this year with partial success. The bill was reported by the Committee on Public Health in the House and received two readings but fortunately was killed on its passage to be engrossed. A bill which proposed that a certificate that a pupil is not a fit subject for vaccination should not be valid unless the child had been actually seen and examined by the physician giving the certificate within

two weeks of the date of the certificate was urged before the Committee on Public Health, but was reported leave to withdraw, which report was accepted by both branches of the Legislature.

LEGISLATION AFFECTING MILK.

An act giving inspectors of milk and collectors of milk samples, authority to take samples of milk intended for sale in their respective cities and towns wherever such milk is produced, stored, or transported, has been enacted.

A bill authorizing the granting of permits under the Provisions of Chapter 744 of the Acts of the year 1914, without an inspection of the place in which, and the conditions under which such milk is produced has been reported by the Committee on Public Health and appears to be on its way toward enactment without much opposition. It would seem that those who believe that milk should be passed by its bacterial count alone, have a substantial point upon those who believe the conditions under which milk is produced should be carefully considered in passing milk. The report of the Department of Health upon its investigation of the milk question was made to the Legislature, but unfortunately no provision was secured for the printing of the report, so that the vast amount of information contained in this report was not available to the public in time for discussion before the Committees of the Legislature. This report calls attention to the fact that the work of the supervision of milk is now carried out by the State

Department of Health, the Dairy Bureau of the State Board of Agricultural, the State Department of Animal Industry, the United States Department of Agriculture and by local Boards of Health. The report gives a summary of the status of local milk inspectors which shows that about 20 per cent. of the total population in the state receive no protection from their local Boards of Health relative to milk. The balance receive some protection, but only 43 per cent. is adequately protected. The report further calls attention to the fact that if Boston is excluded from the list of cities and towns, 25 per cent. of the population receives no protection and only 20 per cent. is adequately protected from possible danger arising from the milk supply. It is well known that there is no law at present providing for state control of the milk supply of this Commonwealth relative to the public health. Milk production should be so supervised as to result in a maximum of cleanliness and safety with a minimum of interference with the milk industry.

The Department of Health bill recommends, first, a bill providing that no person should sell, exchange or deliver any milk not of his own production unless he had received a permit from the State Department of Health. The bill also gives to the Department of Health authority to make rules and regulations relative to the sanitary conditions of production, transportation, processing and distribution of milk. The bill also provides that all milk should be graded in either one of four prescribed grades.

and that the container in which milk was sold should be marked with a grade of the milk which it contained. Authority was given to the Department of Health and its agents to enter all places where milk was stored or kept for sale, and to prohibit the sale or distribution or cause to be pasteurized any milk which might be detrimental to the public health, by reason of disease about or near the premises where the milk was produced or kept for sale. This bill was printed by order of the Senate for the use of the Committees. It will be noted that this proposed bill gives all the authority prescribed in it to the State Department of Health.

The Committee on Legislation of this Association called the attention of the Health Department to certain provisions of the bill which seem to the Committee to interfere with the present administration by the local Boards of Health. The Department, after discussion of that bill with the Committee on Legislation of this Association and others, requested your Committee to assist in the redrafting of the bill. In compliance with that request, members of the Legislation Committee of this Association spent several days with the officials of the Department of Health and others, in drafting a bill relative to the inspection of milk. The bill, which was finally agreed upon as a result of this conference, was presented to the Committee on Public Health and Agriculture by the Committee of Public Health and is known as the Department of Health Bill. The bill provides that the Department of Health, after public hearings, is au-

thorized to frame reasonable rules and regulations relative to the sanitary conditions of producers and distributors of milk which rules shall take effect after the approval of the Governor and Council. It gives to the State Department of Health authority to establish grades of milk, based upon butter-fat content, sanitary condition of dairies and bacterial content. It also gives the State Department of Health the power to fix methods of pasteurization. The bill provides that after the establishment of such grades, if milk is graded, it shall be graded according to the standards established by the Department of Health, and gives to the local Boards of Health authority to require milk offered for sale within their jurisdiction to be graded whenever the interests of the public health render it necessary and desirable. It is also provided that no license under the provisions of Chapter 443, of the Acts of the year 1909 and no permit under the provisions of Chapter 744, of the Acts of the year 1914 shall be issued to any one who has not complied with the rules and regulations established by the State Department of Health. The bill also gives to the local Boards of Health authority to require the pasteurization of milk offered for sale within their jurisdiction whenever the interests of public health shall render it necessary or desirable, but no repasteurized milk shall be sold or offered for sale within the Commonwealth. Provision is made that local Boards of Health shall enforce the provisions of the act, but if the local Boards of Health shall neglect or refuse to enforce the pro-

visions of the act, the State Department of Health shall have the power to enforce such provisions. Provision is also made whereby a Board of Health of a town may request the Department of Health to take over and exercise the power and duties conferred upon them by the provisions of the act and by the provisions of Chapter 744, of the Acts of the year 1914, and in such case the State Department of Health shall take over and exercise such powers at the expense of the town.

After long hearings upon this matter, the Committees on Public Health and Agriculture, sitting jointly, reported no legislation. A movement is on foot to substitute the Department of Health Bill for the adverse report, but at the time of the preparation of this paper it is uncertain with what success

this movement will meet. It will be noted that the present bill is a substantial change from that first recommended by the Department of Health, and it is considered by many that the present bill is the best solution of the much discussed milk problem which has yet been offered.

The report of no legislation upon the recommendations of the Health Department by the Public Health Commission upon this bill was accepted in the House yesterday without debate. I am informed that the gentleman who was to have made a motion to substitute the Department of Health Bill for the adverse report was not present. I understand that this report now goes to the Senate, and that there will be an opportunity to substitute the bill for the adverse report in the Senate.

Discussion.

DR. FRANK E. WHEATLEY: I was requested by the Secretary to open discussion on the two papers to which we have just listened. You have heard a résumé of existing health legislation, from which it appears that the local board has supreme authority in each municipality, and Doctor Curtis apparently believes this to be a wise arrangement.

I note, however, that he regrets that local boards in so many places are inefficient and inactive, and this may be suggestive of a doubt in his mind as to the wisdom of giving local boards supreme authority in all cases.

With a board as efficient as that of Newton, local affairs are perfectly safe, but in some of the less thickly populated parts of the Commonwealth, conditions are not as good. There are some towns where Boards of Health are inefficient and do nothing unless compelled to by state law or public opinion.

I think a provision giving the State Board authority where local boards refuse, or neglect

to act, would greatly increase the efficiency of our health laws.

We all believe in the principle of Home Rule, but we should not insist upon it if by so doing the lives of helpless women and children are endangered. The underlying idea of the legislation providing for State Health Inspectors, was to bring the State Board of Health in contact with communities where local boards were inefficient or inactive. The bill as first drawn would have given the State Board of Health absolute authority over local boards. It was thought wise, however, not to press such legislation at that time. The law, however, does provide that the State Board of Health may order two inspectors into any district in the state, and that they may adopt and enforce such regulations as seem necessary. This power of the State Board apparently is rarely, if ever, exercised. It is well to remember that we now have a paid Board of Health, and therefore we can reasonably increase its duties.

When Doctor Walcott was chairman of the unpaid Board he was accustomed to say to members of the legislature who were interested in health legislation, "Don't throw any more duties on our Board. We are willing to give our advice, but don't desire executive authority." While I have great respect for Doctor Curtis' opinion, I think he has overdrawn the advantages of absolute local control.

In the paper read by Doctor Tobey you have a résumé of what the legislature has done in health matters so far this year. In a negative way we are fortunate. The Anti-Vaccination bill has been killed, and it probably will be killed as long as men who have heard Doctor Durgin's masterly presentation of the subject have any influence with the legislature. I presume the time will come when the Compulsory Vaccination Law will be repealed.

The Milk Bill which has been killed this

morning was perhaps the most important piece of health legislation brought up this year, and I greatly regret its failure. When we remember the number of diseases that are directly caused by infected milk, and that many deaths result each year from the condition of the milk supply, we can hardly exaggerate the importance of legislation of this kind. I believe the proposed bill was well calculated to meet the situation.

The bill providing for various standards meets an objection which is often urged, namely: that milk having a less fat content may still be healthy milk. Two distinct questions are involved, infection and nutrition.

Until the Commonwealth will consent to the enactment of some legislation of this kind, Massachusetts can hardly point with pride to her laws on public health.*

* I am informed that a new bill is now pending.

F. G. W.

Book Reviews.

Mosquito Control in Panama. By J. A. Le Prince and A. J. Orenstein. Pp. 335, ill. 100. G. P. Putnam's Sons, 1916. Price, \$2.50.

For many years past the world at large has known of the wonderful success attained in Panama in the control of mosquitoes and their attendant tropical diseases. Till the present, however, it has been impossible for the general public to obtain any coherent account of the whole problem, the methods by which it has been solved, and the complete results that have so far been obtained.

The authors of the present volume have supplied this deficiency by a carefully arranged synopsis into which is woven a great mass of details covering the varied aspects of the extremely complicated problem presented by the mosquito fauna of the Canal Zone. Aside from General Gorgas himself, no other person could be so well fitted as Le Prince, who had previously taken part in the cleaning up of Havana, Cuba. As junior author, his first assistant, Orenstein, has collaborated in the preparation of the book.

Since the malarial mosquitoes and the yellow fever mosquito are widely different in their occurrence and behavior, the volume is divided into two parts, the first including sixteen chapters on the "Anti-malaria Campaign," and the second, seven chapters on the "Yellow Fever Campaign."

In the portion dealing with malaria there is an account of the results accomplished previous to 1904 in Havana and a description of the situation on the Isthmus in 1904 previous to the American occupation. The latter illustrates well the discouraging conditions which were faced at the outset and will perhaps be rather surprising to those unfamiliar with the tropical jungle and with life in the American tropics. The physiographic and meteorological conditions on the Isthmus, the species of Anopheline mosquitoes and the Anopheles propagation areas are given considerable space and these are followed by a description of the way in which mosquito eradication was attempted. The latter include no less than eight methods of attack, only one of which refers to the destruction of adults.

The propagation areas are of the most varied character, including such diverse situations as

seepage on hillsides, borders of small streams, pools in intermittently flowing streams, hoof-prints in pastures, and artificial (often temporary) accumulations of water of many kinds. Of the eight methods applied, one was usually particularly suitable for given conditions, although many cases are cited where a combination of two or more was found necessary. Some areas were filled with soil, but the conditions under which this was advisable could be ascertained only after careful examination. Drainage was used where economical, and oiling was very extensively indulged in where temporary measures were a necessity. Many situations where oil was not satisfactory were treated with miscible oily preparations (larvicides), and to meet these conditions an improved combination, the "Panama Larvicide," had to be perfected.

Some of the greatest difficulties encountered were due to the nature and growth of the tropical Isthmian jungle, and the methods by which these were overcome receive special mention at some length.

In the chapter relating to the results accomplished by the anti-malaria campaign the authors give a résumé, illustrated by several charts, which show graphically the astonishing reduction of malaria resulting from the mosquito-war. Taken in connection with the great difficulties of the original situation, these should certainly be seen by any who are skeptical as to the feasibility of anti-mosquito work in other parts of the world where conditions are so much more favorable for work.

The part of the book devoted to yellow fever is less extensive than that relating to malaria, but like it is introduced by a preliminary chapter on the previous efforts at Havana. The reason for the curtailment of the yellow fever section is very apparent, however, for in spite of the great importance of this disease in the construction of the canal, the breeding habits of the *Stegomyia* mosquito are such that the control of this species is a far simpler matter than that of the Anopheline vectors of malaria. Thus, while the most spectacular and no doubt also the most important disease affecting the ultimate completion of

the canal was yellow fever, the greatest difficulties were encountered in combating malaria.

From various references here and there in the book it is very evident that the attitude of many contractors and bosses engaged in construction work on the canal was not conducive to the easy application of sanitary measures, nor as the authors abundantly show, was it always to their own benefit in the economic utilization of labor. Such short-sighted policy is greatly to be deplored, but let us hope that the present exposition of sanitary efficiency may help to dispel at least some misguided ideas of commercial efficiency.

The illustrations which are scattered abun-

dantly through the book serve to bring the reader into close touch with conditions in the Canal Zone, while numerous charts, diagrams and maps elucidate certain sections of the text. Owing to the great mass of details which have been incorporated, the style of the authors is in places somewhat jerky and there are many abrupt transitions in the sequence of ideas embodied in single paragraphs of the text.

The authors have certainly produced a volume which may be read with benefit by anyone and may serve as a handbook for those to whom mosquito control is delegated.

C. T. Bruce,

Bussey Institution, Harvard University.

Campaign for Clean Milk. *The National Clean Milk Society, 34 Norfolk St., London W. C. (St. Catherine Press.) Pp. 51, 6 ills. 1s. net.*

This publication is a reprint of articles recently published in the *London Observer*, and is intended as a means of stimulating public interest in the movement for clean and wholesome milk supplies. To the American reader it is chiefly of interest as reflecting English conditions and ideals.

It may surprise some to read that "in the United States far greater attention has been paid to the milk problem than has been done here." The passage of the Milk and Dairies Act of 1915 has, however, stirred interest and led to consideration of ways and means. Much stress is placed on tuberculin testing, the score card, and the object of high-grade raw milk. American practice has been consulted. The

simple methods of milk production championed by Doctor North are given credit, though without discussing their bearing on the validity of the score card. The grading of market milks is given brief mention; in England the idea has as yet apparently made no practical progress. Pasteurization is succinctly treated, and it is intimated that "the decision will have to be made as soon as the milk problem is properly tackled, whether it will be safer to have our milk pasteurized under proper control or to be sold raw." The brochure closes with a summary of the society's proposals, involving nothing unfamiliar to the clean milk movement in the United States.

J. Scott MacNutt.

Health Department Reports and Notes.

REPORTS.

Duluth, Minnesota.

It is with a feeling of satisfaction that the Director of Public Health of this city of some 91,000 population presents his annual report of the Board of Health, for "more has been accomplished during the past year than at any time since its establishment." A crude death-rate of 10.02 is reported for the year, showing a considerable reduction from the rate of 11.83 of 1914, and a continuous reduction since 1906

when the death-rate was 21.18 per 1,000 population.

Scarlet fever seems to have been the greatest problem during the past year reaching the epidemic proportion of 436 cases, though fortunately the deaths were only two. There were 74 cases of diphtheria with a high toll of ten deaths. Every effort is made by the department to induce cases of both the above diseases

to go to the hospital, since it is believed that this is the best way to maintain efficient isolation. There were only 16 cases of smallpox with no deaths in comparison with 157 cases in 1914, yet the department feels that this is false security, since only 34 people submitted to vaccination during the year, and fear is entertained in regard to the young children who enter school during the next year or two unvaccinated. Cases and deaths from typhoid fever were reduced about fifty per cent. The 137 cases of whooping-cough with nine deaths again shows forcibly how wrong the impression is that this disease is in the class of minor contagious diseases.

Among the suggestions put forward by the Division of Contagious Diseases, the following is well worthy of note:

"I would like to suggest to you the advisability of abolishing fumigation after contagious disease, and also the modification of our quarantine regulations so as to allow the wage earner of the family to attend his work while living in the same house with a contagious case, provided that the case is isolated in a separate room and that the wage earner agrees not to come in contact with the patient."

The report of the bakery inspector shows that considerable work is being done in the inspection of such food-stuffs and that on the whole har-

mony prevails between the department and the bakers, confectioners, and restaurateurs. He feels, however, that ordinances must be passed to make compulsory the covering of all bakery goods, candies, etc., and specifically prohibiting the use of roller towels in public places.

The Director of Public Health urges for the future the consideration of the matter of construction of a city hospital and the necessity of a detention building in which to detain suspected cases prior to diagnosis. Furthermore fear is felt in regard to the spread of disease among the foreigners, a great number of whom are settling in the western part of the city, and as a consequence an ordinance governing boarding houses is urged.

It would seem more advisable to arrange the tables of vital statistics in a more convenient and consistent manner, since it is at present difficult to ascertain certain facts without a detailed examination. It is further desirable that more attention should be given over to the discussion of the tables and certain phases of the health work. It is unusual to find in the report of a city of this class with such an undoubtedly creditable health record the omission of discussion on such subjects as infant mortality and tuberculosis.

Perth Amboy, New Jersey.

The annual report of the Board of Health of the City of Perth Amboy is prepared as far as possible . . . in a manner that anyone desiring information regarding a special part of the work may find it in the following pages without difficulty." This seems a logical but often a neglected standard for a health department report. This city has well lived up to such a standard and presents a clear and concise report. The vital statistics are recorded for the last six years thus affording ample opportunity to see the advance in health control from 1910-1916. From a population of approximately 39,700, the death-rate for 1915 is 12.73 per 1,000, lower than at any previous time in the last six years, and a reduction of 1.56 from the preceding year. The deaths from communicable diseases were slightly lower than in the other years but the health department feels that the

number is "entirely too high," particularly in regard to diphtheria and measles which reached epidemic proportions. There were no deaths from typhoid fever, scarlet fever or whooping-cough. In accordance with the more modern theory of health control, fumigation has been abandoned, and in its stead, a visiting nurse is being sent to the homes where a case of contagious disease has recovered to advise the family as to the best methods of disinfection.

The first several pages of the report of the Registrar of Vital Statistics is devoted to impressing the citizens "with the great importance of an accurate and complete record of all marriages, births and deaths." Thus in compliance with the recent resolution of the State Board of Health of New Jersey, a warning is made of the adoption of stringent measures for the prosecution of persons negligent in making reports.

The infant mortality rate per 1,000 living births is 147.77, showing a continuous reduction since 1910. This is undoubtedly the direct result of the employment of nurses to go about the city and visit homes wherein there were babies, giving such information and advice as was thought necessary.

Much attention has been given to securing clean, safe milk and wholesome food supplies,

and several excellent ordinances have been passed for its efficient control.

In outlining the work for the future the health officer recommends the following needs—institutions for the care and treatment of tuberculosis and other contagious diseases, improved methods of sewage disposal and extension of the existing system, and improvement in the method of garbage disposal.

Worcester, Massachusetts.

The annual report of the Board of Health of this city announces the lowest death-rate of half a century. Starting with a recorded death-rate of 30.68 in 1864, this city of 170,000 now shows a rate of 14.53 per thousand population. Unfortunately Worcester must also reckon in the deaths from the state insane hospital which contributed 204 deaths to the annual toll. Correcting for this number, the rate becomes 13.33.

There were only 140 cases of scarlet fever during the year with a mortality of 2.08. Seventy-two cases of typhoid fever were recorded with a mortality rate of 12.5. Diphtheria reached rather high proportions with 342 cases with a mortality rate of 6.14. The department calls attention to the fact that the fatality from this disease is often caused by delay in summoning physicians in cases of sore throat in children, because "so much of the poison is absorbed before antitoxin is administered, that the beneficial effect is lost."

The report of the school nurse shows that very valuable work is being done for the school children and their families. To the nurse are referred for investigation and treatment a variety of defects and diseased conditions, such as cuts, sores, bruises, skin affections and diseases of the eyes, ears, nose and throat.

The chief interest of the year was directed towards the new Department for Tuberculosis. The Putnam ward for advanced cases of tuberculosis was opened to admit patients in December, 1914, and during the year 36 patients had been admitted. Few cities of this class, or even in the higher classes, have established municipal wards for advanced tuberculosis, and this city is justly proud of its accomplishment. In general, the tuberculosis nurse reports 349 new cases of pulmonary tuberculosis during 1915 and 164 deaths. In the review of the nationality of those infected, it is interesting to note the preponderance of the Irish people in proportion to the per cent. of population. Of the 349 cases, 98 were American, 91 Irish, the next highest being Swedish with 38 cases.

In glancing over the financial statement for the year the most striking point is the expenditure of over twenty-five hundred dollars for fumigation. This represents roughly over eight per cent. of the appropriation. In view of the fact that the more modern departments are abandoning this procedure for education and thorough mechanical cleansing, this money could well be diverted from its present use and applied with more effect to some other phase of the department's work.

NOTES.

Chronic Diseases of the Heart, Kidneys, and Arteries, from the Standpoint of Etiology, Prevalence, Mortality, and Prevention.—Dr. Charles Bolduan, director, Bureau of Public Health Education of New York City, presents in the April number of the *Health Department Bulletin* an exhaustive study of the preventive diseases of adult life.

"While the general public, and to a large ex-

tent even the physicians, feel quite satisfied with the death-rates now prevailing, and while the latter frequently point with pride to the marvelous reduction in the death-rate in the past twenty years, closer students of public health have for some time realized that much still remained to be done. By analyzing the death-rate in detail, they have been able to show that most of the health work of recent years has been

directed to the saving of infant and child lives, while practically nothing has been done to prolong adult life."

Doctor Bolduan enters into a detailed statistical study concerning the individual diseases of the organs mentioned. What interests us as health administrators is the large number of closely related chronic diseases, namely chronic organic heart trouble, chronic Bright's disease and arterio-sclerosis. The relations of these diseases from the point of view of preventive medicine to age, sex, social environment, alcoholism, occupation, overeating, etc., are taken up in detail.

Doctor Bolduan devises a plan of education and states that as matters now stand "the two most promising means to pursue to control the diseases discussed in this paper are: (1) The organization of boards of sanitary control to watch over the health of employees, and (2) the extension of work directed against the venereal diseases. Neither of these will be possible without the hearty and intelligent coöperation of the general public, and it is to this end, chiefly, that educational measures must be directed.

"At the outset it is imperative to rouse public opinion. Very few, even among physicians, realize the tremendous importance of the problem presented. As in all other public health activities, the extent and effect of any organized attack on diseases of the heart, kidneys and arteries is determined largely by financial considerations. 'Public Health Is Purchasable' is the motto of the Department of Health of the city of New York, a motto which is definitely applicable to our problem. It is safe to say that money spent on a well-organized campaign of public education concerning diseases of the heart, kidneys and arteries will bring even greater returns than that achieved by the campaign against infant mortality.

"Assuming, then, that public opinion has been aroused through an 'Exhibition of Adult Hygiene'—it is important

(a) To keep it aroused;

(b) To make use of it for the institution of corrective measures.

"Both of these activities devolve principally on the health authorities.

"This work may be carried on in a variety of ways, and each must be employed: Newspaper and magazine articles, both in the form of news items and special write-ups. Popular leaflets, distributed through schools, churches, settle-

ments, labor organizations, shops and factories, and wherever occasion offers. Special circulars of information, of a type similar to government bulletins and giving more extended information concerning particular topics, in form adapted to intelligent lay readers. Scientific articles in medical journals, etc., for the education of physicians and others.

"Noon-day fifteen-minute popular talks in shops, offices and factories. The personal element thus introduced makes them more effective than leaflets. Moreover, such talks always should be reinforced by a supply of literature, passed among the audience.

"Evening lectures—preferably illustrated—before larger gatherings in schools, settlement houses, parish houses, clubs, etc. Literature to supplement the work of the lecture.

"Talks to school children—at opening exercises. (These should deal largely with the rôle of scarlet fever and colds in production of kidney and heart disease.)

"Talks to high school students. The graduating class should learn something about venereal disease, and its relation to the degenerative diseases of later life.

"Traveling exhibits, giving a general view of the problems of adult hygiene. Such exhibits should be simply constructed, so that they can be readily moved from place to place. Vacant stores, settlement houses, schools, churches, etc., can be obtained, rent free, for their display.

"Museums of anatomy, modeled after the museums of the venereal quack, would attract many inquisitive passers-by and undoubtedly exercise a valuable educational influence.

"Periodic physical examinations of employees undoubtedly constitute most effective measures for the control of the degenerative diseases. Such examinations are preventive, corrective and educational in their influence. A little harder to introduce, perhaps, than noon-day talks, or the distribution of leaflets, they nevertheless are so extremely valuable that every effort should be made to secure their adoption by all employers of labor.

"While the results of an educational campaign such as here outlined will not be immediate, there is no doubt at all that they will be certain and lasting. Persistent campaigning along these lines should effect a reduction of two points in New York City's death-rate within ten years—surely a rich reward and one worth striving for."

Epidemic Poliomyelitis in Vermont.—The state of Vermont, during 1914–15, experienced the severest epidemic of infantile paralysis that has ever appeared there. A review of this epidemic by Doctor Caverly, president of the State Board of Health, appears in the *June Health Bulletin* of that state.

Going back over the previous history of this disease in Vermont, it appears that in the summer of 1894 the first considerable outbreak to be reported in this country appeared there, comprising 132 cases. From 1894–1910 nothing approaching an epidemic of this disease appeared, but in 1910, following a severe epidemic in Massachusetts, the neighboring territory in Vermont was invaded, causing 69 cases; 1911, 1912, and 1913 reported 27, 13, and 47 cases respectively. The disease seems to have persisted in the same general localities.

The first cases in 1914 appeared in the same village as the last cases in 1913, in July, and following these 306 cases developed, almost 90 per cent. of the cases appearing in northern Vermont. The division of cases by sex did not differ materially from the usual experiences in these outbreaks, 55 per cent. males and 45 per cent. females. Children under four years of age gave the greatest number of cases, and persons in the age groups above twenty gave the greatest percentage fatality. The mortality of the outbreak was 17.3 per cent.

Paralysis appeared a little earlier in this series than ever before observed, for in 53 cases paralysis appeared on the first day, and in 64 cases on the second day. Throughout the whole epidemic there were many so-called abortive cases, bearing the initial symptoms of the disease, yet which recovered without paralysis. Doctor Caverly regards such cases as surely important features of all outbreaks of this nature and that "early diagnosis and control of these must have undoubtedly an important bearing upon the prophylaxis of epidemic poliomyelitis."

No contact could be traced with paralyzed, abortive or carrier cases in 238 instances. There are then recorded notes and tables bearing on the communicability of this disease with the conclusion that:

"The above facts may or may not indicate a communicable disease. If, as seems likely, many 'potential agents of dissemination' occur in family- as well as community-life under epidemic

conditions, the disease may be classed as really communicable. The bare fact, however, of only one or two frank cases of the disease often occurring in large families, indicates on the surface slight contagiousness."

There then follows much discussion with charts and tables of the geographical distribution, climatical, seasonal and other conditions which might influence the extent of such an epidemic.

It is satisfying to note that in 1915 only 44 cases were reported. This reduction is due no doubt to the experience in diagnosis afforded in 1914; the special research instituted by the State Board of Health, financed by an anonymous donation and directed by the Rockefeller Institute; and the education of the people as to its dangers and symptoms.

The conclusions of Doctor Caverly are as follows:

"The disease seems to be a rural disease.

"The disease, while apparently following the arteries of human intercourse, makes long jumps between towns and attacks persons in isolated and inaccessible regions.

"August, September and October are the favorite months for the disease in Vermont.

"A community visited by an epidemic of this disease has, apparently, comparative immunity thereafter for several years. The experience of Barton might suggest a four-year period.

"As has been stated, poliomyelitis, under our regulations, is reportable and subject to 'Full Quarantine' and terminal disinfection. In the present state of our knowledge of its epidemiology, there may be a theoretical question as to the utility of the quarantine. Practically quarantine measures, well carried out, appear to check community outbreaks. So, in the absence of more positive proof of its inutility, we would not be warranted in abandoning it.

"In this connection, the following from Doctor Flexner's paper summarizes our present knowledge of the ways the infection is spread:

"The data which I have had the pleasure of laying before you have led me to believe, first, that the microbic agent of epidemic poliomyelitis is present in the nasal and buccal secretions and is carried by persons, not insects, and communicated by them in such manner as to gain access to the upper respiratory mucous membranes of other persons, among whom a portion,

being susceptible to the injurious action of the virus, acquire the infection and develop the disease.

"The clinical variety or form of the disease which they develop may be the frankly paralytic, the meningitic, or the abortive and ambulatory in which no severe symptoms whatever appear. But however the persons may be effected, they become potential agents of dissemination of the virus of poliomyelitis, as do a number of healthy persons who have been in intimate contact with those who are ill, and another group of persons who have recovered from an acute attack of poliomyelitis. These several classes of infected or contaminated persons constitute the active means through which the virus is spread and to the control of which sanitary measures designed to prevent epidemics must be directed."



A Study of Venereal Diseases.—The Moral Survey Committee of Syracuse, N. Y., has issued a report of a third statistical study of venereal diseases in that city covering the year 1915. Comparisons with earlier studies for 1910 and 1913 indicate a reduction of 27.7 per cent. in gonorrhœa and 45.4 per cent. in syphilis, but that from 15 to 20 per cent. of men and from 5 to 7 per cent. of women in the city are or have been infected with one or the other disease. The reduction in syphilis is credited mainly to the closing of the segregated district in 1913; in gonorrhœa, mainly to improved control of the liquor traffic and suppression of disorderly hotels and drinking places where men and women congregated.



St. Louis (Missouri) Courts and Prostitution.—An investigation made during the first part of 1915 at the instance of the Neighborhood Association of St. Louis regarding the handling of prostitution cases in the courts of that city was undertaken because of the increase of prostitution during the three months before the investigation began, as compared with its marked reduction during the preceding ten months following the close of the segregated district. Mr. John G. Fertig, who made the inquiry, presents statistics upon the number of cases brought before the city courts and their disposition, and shows that less than 10 per cent. of the cases of prostitution brought before the city courts were

"corrected," and that the practice of putting convicted prostitutes on parole has not in any case resulted in reformation. He concludes that, "The failure to suppress commercialized prostitution in St. Louis must be charged against the city courts and Division No. 2 of the Court of Criminal Correction."



Prison Eye Clinic.—The New York State Commission of the Blind was recently asked to find employment for a blind inmate of Sing Sing prison, whose term of imprisonment would expire within a few weeks. Inquiry disclosed that this man had served a long term, during which period blindness had gradually developed in both eyes. Coincident with this application for employment an appeal was made to the commission by another inmate of Sing Sing for intercession with the governor for a pardon in order that treatment for a serious eye condition might be secured.

A discussion of these two cases with Warden Kirchwey presented an opportunity to offer the services of the commission in an attempt to detect the conditions leading to blindness when the prisoner is admitted and inaugurate remedial treatment which may be of large service in sending him forth to meet the world at the end of his term.

Since this is directly in line with the plan for the New Sing Sing, the consent of Warden Kirchwey was readily secured to establish an eye clinic at the prison, treating and operating for such eye conditions as are found and as may be expected to lead on to blindness or defective vision.

An ophthalmologist of recognized standing, a member of the Advisory Council with the commission, offered his services for one day each week, and the Commission's Social Service nurse, with headquarters in New York City, was assigned to assist; an inmate of the prison whose previous occupation would qualify him to be taught refracting, and another inmate, a registered physician, are assigned as assistants. Suitable dark room and examining room are afforded adjacent to the prison hospital, and medicine and other accessories are furnished at the prison.

It is apparent that a prison population presents a favorable field for preventive medicine to demonstrate its service. It is also apparent

that a state can practise a distinct economy in citizenship as well as in dollars and cents by offering preventive medicine to this population.

As soon as facilities and funds permit, similar clinics will be offered to other state prisons.



Coöperative Pasteurization.—In the East it is more or less a debatable question as to the benefits to be derived from coöperation in the various processes involved in the milk industry. Yet according to the May *Monthly Bulletin* of the California State Board of Health such coöperation has proven most satisfactory in that state. While, according to the new California milk law small dairies may have their cows tuberculin tested without restoring to pasteurization, owners of small dairies may desire it any way. An example of coöperation in pasteurization is furnished by the town of Riverside, where such a plant has been running since 1911, organized by seven dairymen.

To quote from the report of the city health officer of Riverside as to the operation of this plant and its effect upon conditions in that town:

"In July, 1910, milk retailed at $8\frac{1}{2}$ cents per quart. In November, 1910, the price was raised to 10 cents per quart. A series of tests showed the butter fat content to vary from 3 to $4\frac{1}{2}$ per cent., depending to a certain extent upon the convenience of the water supply.

"After formation of the dairy company, the price was immediately reduced and reductions have continued until at the present time milk containing 4.2 to 4.5 per cent. butter fat is sold for fifteen quarts for \$1.00, or at $6\frac{2}{3}$ cents per quart.

"Since the formation of this company the number of dairies in the county has doubled.

"All the milk and cream is pasteurized by being subjected to a temperature of from 147 to 160 degrees for 10 to 15 minutes. The milk is first agitated and cooled at the dairies, delivered immediately to the central plant, where it is pasteurized, bottled, reduced to a temperature of between 30 and 40 degrees Fahrenheit in the precooling plant and delivered to the consumer.

"For the purpose of delivery but three wagons are used for the retail trade, whereas formerly the same amount of milk from the same number of dairies would have required fifteen wagons.

"The total investment in this distributing

station at the present time represents in real estate, buildings, machinery and improvements about \$31,000. There is a floating indebtedness of \$11,000, drawing 6 per cent. interest, and accumulated assets of \$9,500.

"Three dairymen are employed to manage the business at a sufficient salary to justify them in accepting such employment and discontinuing active dairy work. Sweet milk and cream are sold not only in the city of Riverside, but in the adjoining towns.

"There are at the present time ten employees: the three dairymen above mentioned, three men for delivery and three men who operate the plant, and one bookkeeper.

"The advantage of this method of handling the city milk supply is apparent. If at any time it is found on inspection that any of the contributors to this station are producing milk under conditions which are not satisfactory, a notice to the producer from the plant is sufficient to prevent the sale of this milk. The fact that our general milk supply is pasteurized does not in any way deter either the dairymen or the inspectors from insisting upon the production of clean milk.

"I believe that the result of the central dairy plant experiment has fostered and very greatly increased the dairy business; that the dairymen receive more for their products; that the consumer receives a higher grade of milk at a less cost, and that two-thirds of the vexatious problems in the control of a small community's milk supply have been solved by the introduction of this plan."



Relative Mortality of Abstainers and Non-Abstainers.—What appears to be a convincing argument for abstaining from alcoholic beverages to persons who are interested in enjoying their full three score years and ten is presented by Arthur Hunter, actuary of the New York Life Insurance Company, in the May *Monthly Bulletin* of the Department of Health of New York City, under the title of "Life Insurance and Drinking Habits."

After presenting in detail the statistics of the various insurance companies throughout America, the author comes to the following general conclusion:

"The opinions of the medical directors show

that the life insurance companies look with disfavor on applications from persons who drink freely although not to the point of intoxication, and on those who have taken alcoholic beverages to excess in the past but are temperate now. The statistics already submitted, and others to which reference has been made, prove conclusively that this attitude of mind is based on facts, and that a higher mortality must be expected on these types of users of alcoholic beverages. On the other hand, it is conclusively proved that total abstainers are longer-lived than non-abstainers, even excluding from the latter those who drank immoderately at the date of application for insurance or prior to that time. The experience of the seven American life insurance companies has proved that abstainers have from 10 per cent. to 30 per cent. lower mortality than non-abstainers, and there is no good reason for believing that if the other companies compiled their statistics there would be any different result, provided the companies exercised the same care in accepting abstainers and non-abstainers. The American statistics, now published, corroborate the British data in indicating the unfavorable effect of alcohol on longevity, and in showing that total abstinence decidedly increases longevity."

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The Milk Supply of New York—A Lesson in Municipal Sanitation.—Dr. Lee M. Steckel in *American Medicine* for May, 1916, tells of the tremendous task confronting New York in its fight for a sanitary milk supply.

"To furnish an adequate supply of pure milk to more than five million mouths is a task as difficult as it is interesting. The problem of New York City's milk supply presents one of the most important chapters in the complexities of modern urban life.

"It is no small undertaking when you consider that New York City consumes over 2,000,000 quarts of milk daily, produced by about 350,000 cows, scattered on 44,000 farms located in six states, is passed through 11,000 creameries and then shipped to New York, a

distance of from 50 to 450 miles (in over 250 special milk cars); requires more than 6,000 wagons to deliver this milk in Greater New York, while there are about 14,000 stores retailing milk. All in all, it requires an army of 200,000 persons to carry out this gigantic task daily.

"There are now three grades of milk sold in the city. Grade A, both raw and pasteurized—for infants. The raw milk must come from cows free from tuberculosis, as shown by a tuberculin diagnostic test; it must conform to strict sanitary methods of production and handling, and must not contain more than a limited number of germs. It is distributed in bottles. Pasteurized milk comes from healthy cows and must be produced under sanitary conditions. The germ content is limited. It is also delivered in bottles. Grade B—is pasteurized milk for use by adults only. This milk comes from healthy cows and is produced under careful methods, but the germ content may be larger than in Grade A milk. Grade C—is milk which is not produced under as careful methods as the above grades. It must be pasteurized or boiled and only be used for cooking and manufacturing purposes.

"In order to ship milk to New York City, the dairyman must have healthy cows, clean barns, pure water supply, clean utensils, milk with clean hands; he must discard any abnormal milk, and he must keep the milk cold until delivered at the creamery. He must not ship the milk if there is an infectious disease at the farm. At the creamery, too, the milk must be kept cool until pasteurized and must be bottled under strict sanitary conditions. During transportation on milk trains, the milk must be kept cool and tightly covered. In the city plant, on the wagons at the stores, sanitary measures must be adhered to, in order to avoid any possible contamination.

"The fight for a sanitary milk supply for this city has finally been won. All factors are now harmoniously working together in an effort to supply New York City with the best milk obtainable."

Public Health Notes.

A State-Wide Campaign in Social Hygiene.—In the warfare against venereal diseases and allied evils, the Oregon Social Hygiene Society has now been engaged for five years. During that time its activities have been incessant. Its directors, serving wholly without pay, have been active workers, meeting in various committees many times each year. In the first years of effort, they withstood the reproaches of those who clung to the conspiracy of silence in matters of sex, and they suffered the vilification of "men's specialists" and other quacks who found their victims slipping from their clutches. The approved speakers of the society have given their invaluable aid freely and enthusiastically. They have made more than 1,500 addresses in more than 117 cities and towns in Oregon, and, indeed, in 15 cities of other states. They have prepared publications and exhibits. With great care they have arranged the details of many public meetings. They have cheerfully faced the discomforts of travel in sparsely settled regions of Oregon. They have given services which, measured by their earnings in gainful occupations, would have cost the state at least \$10,000 a year; but of course such services could not be bought with money.

Other states have asked, "What is the secret of the success of the Oregon Society?" According to their repeated assertions, the Oregon Society is now regarded as the standard for state-wide social hygiene education in this country. Their only secret of success is their ability to command the continued labor and devotion of their committee members.

These men, and hundreds of men and women who have coöperated with them throughout the state, have been rewarded by abundant evidence of improved conduct and ideals. The chief sex lies, used for generations to excuse prostitutes, male and female, and to lead them on to the worst of contagious diseases and to moral degradation, are now known to be lies among thousands from whom the truth had been withheld. Now, after four years of public education, for a man to hold that sexual intercourse is a necessity for health, that gonorrhœa is not dangerous or that there should be a double standard of morality, displays such inexcusable

ignorance of scientific facts that these harmful utterances are fewer by far than four years ago.

The distribution of 770,000 circulars, the presentation of exhibits to 113,000 persons, the holding of 1,500 public meetings, the reaching of 6,000 homes by personal visits, the placing of 2,100 State Board of Health Placards of warning against venereal diseases, the renewal of 400 quack medicine signs, the assistance of 6,000 men and boys who applied to the Advisory Department, the instruction, in specific ways, of parents, of teachers, of employers, of girls in factories and stores, of boys in morally dangerous occupations, of men in lumber camps and railroad shops, of groups everywhere in special need—all these and other activities of the society have done good to most communities in the state.

So far has the society gone in its campaign against fake advertising that not only has every newspaper in the state of Oregon cleaned its columns of the most pernicious types of quack doctor material, but one paper has been forced to issue a special edition for Oregon, purged of its vilest matter.

The work of the society has been made possible by subscriptions from private citizens in amounts from \$1 to \$500, aggregating several thousand dollars, and by the appropriation of \$35,000 from the state.

It is virtually certain that the economic gain alone, due to curbing the spread of venereal diseases and the consequent increase in the number of days per year of productive labor of Oregon men and women, has in five years amounted to \$200,000. Incomplete though the evidence for such an estimate must be, it is nevertheless extensive and sufficient to warrant the minimum named. The actual material saving to the state, due to this one cause, probably has been greater. The additional economic gain to the state during this period, due to the extermination of highly successful quacks, has certainly not been less than \$100,000. The known financial condition of several fake concerns, previous to the opening of the campaign against them, indicates that this estimate is low. Considering nothing but the immediate gain in dollars and cents, the

returns to the state upon its investment in social hygiene education have been enormous. It is difficult to see how any state can afford *not* to make such an investment.

Information regarding the methods employed by the society and samples of its publications will be sent upon application to the Executive Secretary, 720 Selling Building, Portland, Ore.



The Possible Role of Books in the Dissemination of Disease.—An authoritative discussion of a practical subject is always to be welcomed. Such an article appears in the *Johns Hopkins Hospital Bulletin* for June, 1916.

From the public health standpoint books which have come in contact with patients suffering from the communicable or the contagious diseases are always likely to be considered factors in the spread of such diseases. Many individuals, in fact, attribute attacks of such infections as diphtheria to the handling of books previously used by individuals suffering from diphtheria, but in no instance has this relationship ever been satisfactorily demonstrated by the isolation of the diphtheria bacillus from this source. Despite this fact, current popular literature is full of references to this mode of infection.

A very careful series of experiments were carried on by Dr. C. A. Laubach with pathogenic organisms under various conditions. From these experiments which were repeated a number of times the following conclusions were drawn:

1. Pathogenic bacteria can seldom be isolated from books which have been handled by sick patients, and there is, therefore, no empirical reason for maintaining that books serve as vehicles of infection.

2. Direct sunlight and diffuse daylight are the most efficient germicides for organisms found on books, as they are for the same organisms under other conditions.

3. The fact that pathogenic bacteria, like the typhoid bacillus and diphtheria bacillus, can be recovered from artificially infected books under various circumstances after long periods of time, and the fact that the diphtheria bacillus does not lose in virulence during this period, are a sufficient reason for insisting upon the thorough disinfection of books which have been handled by patients.

Will the Private Practitioner Determine the Future of Public Health Work?—This is the question Dr. Haven Emerson asks in the *New York Journal of Medicine* for May, 1916.

"It is my belief that the practitioner of medicine, as an individual and through his scientific and socio-professional organizations can direct the development of future public health activities to the very great benefit of the community and a coincident improvement in his own status, professional, social and economic.

"It may be accepted as axiomatic that public health work can progress only so far and so fast as the family physician is ready to go. If he had disapproved of the use of diagnostic throat cultures, diphtheria could not have been reduced. When he found the examination of sputum and the Widal test of value to his patient, he acknowledged the right of the state to inquire as to the identity, residence, occupation, etc., of his patient for the community's sake.

"If the practitioner of medicine had not been heart and soul in the attack upon excessive infant mortality, the appeals of the public agent would have fallen on deaf ears. The community would have discounted the educational propaganda of health departments if the family doctor had not agreed in and supported the campaign.

"The physician who waits for the typhoid which used to flourish, and mourns the good old times when he could rely upon a living in summer from diarrhoeas of infants, and in winter from the devastating epidemics of diphtheria and scarlet fever, must see the writing on the wall, and reach out for practice among people who expect a physician to protect them as individuals in the way the community is protected by public health officials, by studying how the well may be taught to keep well, by hunting for the cause and following his case until he is assured that prevention as well as curative treatment has been applied.

"He must familiarize himself with the hazards of occupation and environment, of housing and of habit, and use the Health Department as his own professional research force to solve his personal problems, and to apply the preventive measures for the community's sake as he himself has in the case of his patient.

"Health departments can and doubtless will turn over to physicians a larger and larger share

of work as fast as the practitioners show their willingness to join in the partnership of prevention.

"This most desirable incorporation awaits only the action of the organized medical profession. We are all enlisted in the same army, the army of sanitation, the army for social protection and reconstruction."



The Movies as a Health Problem.—The editor of the *Modern Hospital* has the following to say on this timely question:

"Every day we see or hear some reference to the educational value of motion pictures, and great numbers of writers, artists, philanthropists, and reformers are concerning themselves with one phase or another of that problem.

"We hear learned discussions pro and con of the relative value of this or that kind of picture, and the censors almost tear each other's hair over the question of the suppression of a 'scene' of one kind or another.

"Perhaps it might easily be said that a discussion of the ethics and the sociology of the motion picture is foreign to the purposes and functions of a hospital journal, or a publication devoted to the public health, but suppose there was a real vital health problem coupled with a most important social question—it seems to us that in such an event*the *Modern Hospital*, being deeply concerned about whatever has to do with the health of the people—moral, mental, or physical—would be entirely justified in approaching the problem from its own viewpoint.

"And we do see a health problem in the present movie craze. We see our children and our young people, and also our elders, running to the movies night after night; we see them less content to spend the evening at home; we see them less frequently reading one of the classics, or even the better current works of fiction, to say nothing of serious literature.

"We are seeing less of settled home life and its interests, less of that introspection and meditation so necessary if we are to approach each day's tasks with proper forecast and prearrangement.

"We are seeing our young people more and more dependent on extraneous influences and outside excitement for entertainment, less self-

contained, and less capable of the enjoyment of life for what is stored within themselves.

"We believe that the movie craze is doing more to destroy the home life of the American people than all other influences combined; and we believe that it is as harmful an influence, and in the same way, as cocaine or morphine or whisky.

"We believe the educational value of the movie is infinitesimal in comparison with its power for harm."



The Convalescent Field—Its New and Changing Borderlines.—In the *Modern Hospital* for June, 1916, appears an article from the pen of Dr. Frederick Brush which is timely and interesting. As Doctor Brush points out "the hospital efficiencies most needing development are not now internal, but are in the lines of the hospital extensions—in work for health outside of the main buildings. Better dispensary service (with some branch stations), health center work from hospitals, adequate social service, long-term 'follow,' prevention, convalescent supervision—these indicate the main attracting possibilities of the newer hospital efficiencies. The American hospital is yet greatly underrated as a health instrument. It survives many stresses, grows steadily, and gets funds beyond almost any other organization. The present need is not for so many new, small, and precarious associations, but longer, stronger extension arms to the hospitals."

Doctor Brush then traces the development of the convalescent home. (1) The older type of convalescent home usually small. (2) The larger institution affording some classification of the patients, medical attention, occupational training, etc. (3) The country branch hospital. (4) The pay convalescent home. (5) Home convalescence. (6) Convalescence.

The more recent extensions and plans in this field cover (1) surgical dressings; (2) heart disease; (3) privisions for men; (4) rheumatism, tuberculosis, bone, kidney and other forms; (6) mental convalescence; (7) adolescence; (8) colored people; (9) preventive convalescence.

Hospital efficiency thus covers convalescence, which is taken here to include health increase, health holding, and prevention of health deterioration. Training the sick, handicapped or subnormal, to their fullest working efficiency, and

keeping them there, differs widely, as a plan, from the old admitting, treating, and discharging of patients. With this preventive health upbuilding well under way, there would be needed five beds where now is one. We have tested and estimated that, at lowest, 10,000 adults per year should and would go out for short periods of health building from New York dispensaries alone; a little over 500 may go this year. The dispensaries and the various social services must be the main dependences in finding and sending these patients. The medical-social machinery to accomplish this does not yet exist, or is inactive. This is really the big end of the convalescent job; and scarcely anybody is on it.

✦

The Use and Abuse of a Public Health Laboratory.—Modern medicine has undergone a revolution during the past two decades. With Pasteur came a new conception of disease. Koch, Laveran, Klebs, Loeffler and others lighted the way to the heights to which modern medicine has climbed. The article in the *Southern Medical Journal* for June, by Dr. C. R. Stringly, on the use and abuse of this new development, is doubly interesting therefore.

"The microscope, the laboratory, in conjunction with practical test and scientific research, has done much to enable the modern school to know the cause and to intelligently combat disease, and while there is much yet to know, empiricisms need not altogether satisfy.

"Aside from research work, the use of the laboratory in the diagnosis is limited only to the extent the knowledge of cause and nature of disease is limited, and in many diseases, though the cause is unknown, the microscope reveals the morbid processes with such certainty that we are at least able to label these.

"That the state laboratory is educational to the average physician I believe there is no gain-saying. His conception once was that diphtheria was a disease of the upper air passages. Our laboratory experience teaches us that occasionally we find violent infection in other locations, due to the Klebs-Loeffler bacillus.

"Unquestionably, the most serious abuse of the laboratory—and especially is this true in the institutions supported by the state—is occasioned by the lack of skill and caution with which phy-

sicians secure and prepare the specimen upon which the laboratory diagnosis must be founded. It seems to the laboratory man—it may be that he is somewhat influenced by his enthusiasm for his own work—that the conscientious physician of today cannot hope to fully serve those who depend upon his skill for life and health, those who depend upon him not only to protect them, but to protect his family, the friends and the public from the infection, unless he uses the laboratory; yet, use is futile unless the physician gets the material to the laboratory which will reveal the real condition. Not only is the reputation of the laboratory dependent upon the skill of the physician who prepares the specimen, but, and of real importance to the public, the treatment and prevention of disease depends, in many cases, totally, and largely, in a constantly growing number, upon that skill used by the physician sending the specimen."

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Five Years Progress in the Diagnosis and Treatment of Consumption by Massachusetts Physicians.—In 1911 Dr. John B. Hawes of Boston published a paper on the early diagnosis and prompt treatment of pulmonary tuberculosis. The conclusions from this study "were not encouraging, nor did they reflect creditably on the ability of our medical profession to diagnose tuberculosis in its early stages or its willingness to institute prompt and aggressive treatment. For instance, out of the 500 patients then in our sanatoria, well over 50 per cent. were told by the first doctor they consulted that they did not have consumption, while of those who first went to a doctor on account of a hemorrhage, nearly half were informed that the blood did not come from their lungs, and that they did not have tuberculosis."

Since that time a vigorous anti-tuberculosis campaign has been carried on. In the *Boston Medical and Surgical Journal* for June 1 Dr. Hawes presents some facts which "are based on a study of 100 consecutive cases diagnosed as tuberculosis at the Massachusetts General Hospital, 100 at the Boston Consumptives' Hospital, and a further study of 500 patients at the North Reading, Lakeville, Westfield, and Rutland State Sanatoria.

"1. In the early diagnosis of tuberculosis distinct improvement has been made during the

past five years, as shown by the increased number of diagnoses of incipient tuberculosis without the presence of a positive sputum.

"2. As far as can be judged from figures obtained at the Massachusetts General Hospital and the Boston Consumptives' Hospital, diagnosis in all cases was made very promptly in 1910, and likewise in 1915.

"3. There has been a vast increase in the number of patients who have gone to a doctor before they suspected they had consumption; as shown by the figures, 77 out of 500 in 1911, and 408 out of 500 cases in 1915.

"4. The chief symptoms for which patients consulted their physician in 1915 remain the same and in the proportion as was found to be the case in 1911.

"5. In cases of hemorrhage fewer patients who first consulted their physician for this reason have been told that they did not have consumption in 1915 than in 1911. This is likewise the case in regard to the patients who were told that they did not have consumption on first consulting their doctor. The improvement in these two respects, however, is not as great as was to be hoped.

"6. The diagnoses given to patients by their physicians who said that they did not have consumption in 1915 range themselves in the same main groups as was the case in 1911. It is not encouraging that, at the present time, out of 500 consumptives, over 50 per cent. were not given to understand by their physician that they had consumption.

"7. There has been an encouraging increase in the number of applications for our State Sanatoria which were made by the physician either at the time of the examination of the patient or immediately after. In view of the length of the waiting list for the Massachusetts State Sanatoria this is an important thing for the physician to remember if he wishes to secure early treatment for his patient.

"8. The number of physicians visited by these 500 patients in 1915 was approximately the same as the number in 1911. Of the 1915 patients, 163 consulted only one physician, while 336 went to two or more physicians.

"9. Of these patients who consulted two or more physicians, 41 per cent. went to another physician in order to be sure the first was right, 23 per cent. because they did not improve under

the treatment given by the first physician, and 17 per cent. because the first physician advised them to do so.

"10. According to the statements given by these 500 patients, it cost \$5,435, or approximately \$10 per patient, for them to obtain diagnosis and treatment for their condition."



Hippocrates on Hookworm Disease.—The following excerpt from the works of Hippocrates, published in French in Paris, in 1846, Vol. 5, page 165, is of unusual interest. Evidently a case of "miner's anæmia" is described:

"Symptoms of the miner—the hypochondrium stretched straight; fatty spleen; extended stomach, a little hard; difficulty in breathing; paleness. In him the illness attacked his left knee causing a relapse. He was examined completely."

This passage occurs in connection with a description of an epidemic at Perinthus. The symptoms are highly suggestive of hookworm disease.



Stationary Population.—There are a hundred million people in the United States, whereas three centuries ago there were not one million. Meantime the population of Europe has grown enormously. Not long ago the British Isles contained fewer people than are now in the state of New York. In Frederick the Great's time Prussia had only five million inhabitants. From the beginning of the present industrial régime of factory production continuous growth in population has been an important factor.

But for years the birth-rate has been falling rapidly all over the Western World. So far, this has been virtually offset by a fall in the death-rate. Only in France has growth of population actually stopped. But there are more positive limits to a decline in the death-rate than to a decline in the birth-rate. Already in countries where hygiene is most advanced—as the United States, Great Britain, France, Germany, Switzerland—the death-rate is round fifteen to the thousand. Whether it can be got very much below that is a question.

Meantime, undoubtedly, smaller families are more and more the rule in the most civilized countries. It is pointed out that in such countries—or those of them that keep statistics on

the subject, which, to our shame, does not include the United States—the birth-rate has fallen to a level no higher than that of France several decades ago; and the French birth-rate kept on falling until it virtually equaled the death-rate.

Certain students of these phenomena see, in the not distant future—especially in view of the war and its possible after-effects in the way of enforcing economy of living—a positive cessation of that rapid growth of population which has characterized the modern era in Europe and this country; probably this is desirable. Humanity has been too cheap.—*Saturday Evening Post*, June 30.



Ankylostomiasis Campaign.—Dr. Don Morse Griswold, director of the campaign for the relief and control of the hookworm disease in the Island of Antigua, British West Indies, undertaken by the International Health Commission, in his April *Report of Progress*, states that:

"Census taking has been completed in all the villages. The only additions likely are people who move into the area before the campaign here is closed. The total number of people in the Belvidere District is 880.

"All of these people have been examined who are likely to be examined. Only one refusal of examination has been met; persons under treatment for other diseases are not examined, except with the consent of the attending physician. A spirit of procrastination is everywhere present, but this will not seriously delay the work.

"Of the 820 persons examined, 238 were found infected with hookworm. This makes a rate of infection of 29 per cent. for this group of villages.

"Of the 238 persons who were found infected, 222 have started treatment.

"Of those taking treatment, 62 have been cured; 53 were cured with two treatments, 5 with three treatments, and 4 with four treatments.

"Thirty-seven persons have been found infected with the Schistosome Mansonii. This infection is very rare in any part of the world. The small number of cases reported in the medical literature have mostly come from the West Indies. This will be made the subject of a special report, when the extent of the infection, and the clinical aspects of the disease have been thoroughly studied.

"There are five privies in the area which embraces 880 people."

Industrial Hygiene and Sanitation.

Free Insurance to Employees.—The following is a copy of a letter sent on April 1 by the Marconi Wireless Telegraph Company of America to all its employees:

"To All Employees.

"Marconi Wireless Telegraph Company of America.

"Being constantly mindful of the loyalty and efficiency of our employees, and appreciating those qualities upon which the continued success of our company depends, and after a careful study of more than two years as to the best method of showing our appreciation, it has been decided to maintain for all employees, without expense to them, insurance in the sum of \$500 for all those who have been with us over one year but less than five years, and in the sum of \$1,000 for all those who have been in the employ of the company five years or more.

"It gives us pleasure, therefore, to announce that you are now, and from this date, protected by life insurance payable to your beneficiary in the event of death while in our employ, without expense to you.

"The protection of one's family in event of death is of vital concern. The ordinary cost of life insurance in proper amount is so great as to cause a heavy burden upon the income. In addition, many would be unable to pass the rigid requirements of the necessary medical examination for individual insurance.

"We are, therefore, particularly pleased to announce that arrangements have been made by which this insurance will be granted upon present employees without medical examination.

"Attached is a form of application blank. Please fill this out at once and return it to the head of your department through the person

delegated to receive it. From the information on this application the insurance will be issued, and all charges will be paid by us. In the event of death of any employee the full amount of the insurance will be paid to his beneficiary. In the meantime, however, this insurance is effective April 1, 1916, upon all in the active service of the company on that date, whose period of service entitles them to receive such insurance.

"In consummating this arrangement, it gives us pleasure to acknowledge the high order of intelligent and zealous service which has characterized the work of our employees in the past and we have every confidence that it will be continued in the future.

"With every good wish for the greater success and happiness of all,

Very truly yours,

E. J. NALLY,

Vice-President and General Mgr."



The House That Jack Built.—(Not written by Mother Goose but by the general safety agent of the New York Central Lines and consists of two reels, 2,700 feet, and 178 scenes.)—Jack is a brand new film hero and his one besetting sin is carelessness. One night, however, Jack attended the Company's "Safety Rally" at which Jack and his wife saw pictures of railroad disasters due to carelessness. Men were shown losing fingers, eyes, legs and arms and other valuable adornments, and by the time the Rally is over Jack decides it's about time to turn over a new leaf and be careful. So he goes home and "bends over the bed in which his two children are sleeping and resolves to banish carelessness forever."

The drama closes with a "cut-in" which reads:

Resolution became the Cat
That killed Carelessness, the Rat,
That was eating Happiness, the Malt,
That lay in the House,
That Jack built.



The Republican Platform Has Inserted This Plank.—"We pledge the Republican Party to the faithful enforcement of all federal laws passed for the protection of labor. We favor vocational education; the enactment and rigid enforcement of a federal child labor law; the enactment of a

generous and comprehensive workmen's compensation law within the commerce power of Congress, and an accident compensation law covering all government employees. We favor the collection and collation under the direction of the Department of Labor of complete data relating to industrial hazards for the information of Congress to the end that such legislation may be adopted as may be calculated to secure the safety, conservation and protection of labor from the dangers incident to industry and transportation."



Minimizing Accidents in Shops.—The Department of Labor of the State of New York has issued a special bulletin on industrial accident prevention under the direction of the Industrial Commission. The pamphlet is divided into two parts. The first shows what progress has been made in the work of accident reduction in a few of the establishments visited, and the second is a discussion of the means by which these results have been accomplished.

"Every accident," says the bulletin, "indicates the presence of defects in materials, machines, methods or men, or, what is perhaps most common, in a combination of two or more of these elements. The relative weight to be given each of these factors is not constant for all industries nor for all plants in a given industry." After considerable experience one large steel plant has estimated that the efficiency of its safety work is distributed as follows:

	Per cent.
Organization.....	45
Attitude of officers.....	20
Safety committees.....	20
Inspection (workmen).....	5
Education.....	30
Instruction of men.....	15
Prizes.....	9
Posting signs.....	3
Lectures.....	3
Safeguarding.....	25
Safety devices.....	17
Lighting.....	5
Cleanliness.....	3

The above distribution is suggestive at least of the nature of successful safety efforts.

The reduction of accidents depends, first of all, upon the attitude of the employer. It is of

little use to preach safety to men who work about unsafe machinery and in unsafe factories. Of course, guards cost money. But the compensation paid for a life or an eye would buy guards for belts and gears. Some accidents will still happen through the carelessness or ignorance of the workmen, the driving practices of tactless foremen, or through some other defects which cannot be prevented by mechanical guards.

The employer is not always in close personal contact with his men. In such cases he must delegate to his agents—his superintendents and foremen—the same authority and responsibility in the work of preventing accidents that he gives to them in maintaining the output of his plant.



The Comfort of Women Employees.—Miss Marie Louise McComb, the welfare secretary of the Export Building in New York, is to be responsible for the comfort of all the employees of the forty-story New York skyscraper, from the heads of departments to scrub women. It is estimated that in this building there are about 600 women employees in the office forces, and for their comfort and convenience the welfare department is to be maintained as a part of the building equipment.

This service comprises five suites of rooms on floors so selected that they best meet the distribution of the women employees over the building. Each suite has a large "rest" room. It is comfortably furnished with chairs and lounges, and these, with the rugs, pictures, and window curtains, all harmonize in one color scheme, either green or brown. There is a silence room, in which there are four or five cots. The room is almost totally dark and here opportunity is given for complete rest for those women who become ill, faint, or nervous, and have to leave their work in search of relief.



Government Survey of Health Insurance.—A pamphlet of some seventy-six pages entitled "Health Insurance: Its Relation to the Public Health" has recently been issued by the United States Public Health Service. The pamphlet was prepared under the direction of the Surgeon General and presents fully the economic claims and data underlying a system of sickness insurance for wage-earners. Much information from

private and official sources is included, bearing upon the prevalence and cost of sickness and the conditions causing illness among employees. An attempt is made to apportion the responsibility for these conditions between employer, employee and the general public.

The remedy for the present situation is held to be some system of state-administered compulsory sickness insurance. A summary of the conclusions reached by the report is as follows:

"Health insurance is the most feasible measure, because (a) it is a method by which the cost of sickness is distributed among those responsible for conditions causing sickness and whereby the burden upon the individual is lightened, and (b) it gives a financial incentive for the prevention of sickness to those who are responsible for conditions causing sickness.

"Health insurance in its most highly developed form (a) provides for adequate cash and medical benefits to all wage-earners in times of sickness; (b) distributes the cost among employers, the public, and wage-earners according to their responsibilities; (c) becomes an effective health measure by stimulating the coöperative effort of the three responsible groups and by linking their efforts with those of national, state, and local health agencies; (d) correlates all the forces at work in the prevention of disease, and (e) affords a better basis for the coöperation of the medical profession.

"Under an efficient health insurance system a contribution of approximately 50 cents per week per insured person (25 cents by employees, 20 cents by employers, and 5 cents by Government) should enable the insured person to receive; (a) \$7 per week when disabled on account of sickness or non-industrial accident for a period as long as twenty-six weeks in one year; (b) adequate medical and surgical care during disability; (c) medical and surgical care of wife of insured person during confinement; (d) a death benefit of \$100. Budgetary studies of large numbers of workingmen's families show that many workers pay as high as 90 cents per week and receive little more than actual funeral expenses.

"A governmental system of health insurance can be adapted to American conditions, and when adapted will prove to be a health measure of extraordinary value."

Buttons.—The *Travelers Standard* for June describes in an interesting article the dangers which may arise in the process of making that commonplace but very necessary part of our wearing apparel, the button.

The most hazardous button factory is the one in which celluloid is mainly used as the basic material. In addition to the celluloid there is usually a stock of cardboard, varnishes, lacquers, thinners, japans, and coloring materials—all of them high inflammable, and some of them explosive under certain conditions.

The manufacture of metal buttons has other hazards which are involved in the operation of stamping machines or other similar equipment. The chief hazard of the metal button factory is in the japanning department. In many respects japanning is done under the same hazardous conditions as coloring. The air in the neighborhood of the spraying machines is often saturated with explosive and poisonous vapors, and it is therefore important to install exhaust fans near them, or to provide other adequate means for securing positive and efficient ventilation.

Chronic bronchitis and bronchial hemorrhages are not uncommon among the workers, and these are attributable to the irritation of the respiratory passages caused by inhaling the dust. The dust hazard in button factories can be materially reduced by adequate general ventilation, supplemented by hoods and exhaust ducts placed close to dust-producing machines. It is evident that the hazards from power-driven machines in button factories are similar to those prevailing in many other industries, and as such they can be dealt with by mechanical safeguards. The dangers peculiar to the industry are confined to the hazards of fires, explosions, and poisonous fumes in certain types of button factories, and the occupational disease hazard in other types.

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Industrial Anilin Poisoning in the United States.—The above is the title of an article by Rey Vincent Luce, M. D., of Akron, Ohio, and Alice Hamilton, M. D., of Chicago, which appears in the *June Monthly Review of U. S. Bureau of Labor Statistics*.

In describing the use of anilin in industries abroad and in this country, its toxic effects and symptoms of poisoning, reference is made to

cases of industrial anilin poisoning which have occurred in the United States. The following are the conclusions arrived at in this report:

"Commercial anilin is a well-known industrial poison in Germany and Great Britain. It is just beginning to be known in the United States, where it has already been the cause of numerous cases of poisoning among men engaged in the manufacture of rubber goods, in reclaiming rubber from scrap, in making anilin from benzene, and in using certain washes for press rollers.

"It is a blood poison, causing the formation of methemoglobin with the consequent 'internal suffocation.'

"Poisoning may take place through the skin or the lungs. Usually in industrial cases both portals of entry play a part.

"Exposure to the fumes need not be excessive or long-continued to bring about serious symptoms in the susceptible.

"Young men are more susceptible than the old or middle aged, blonde than dark-haired men, heavy drinkers than the temperate.

"Hot, humid weather, heated rooms, and poor ventilation are important factors in the production of acute anilin poisoning.

"Early recognition of anilin poisoning is of prime importance so that the sufferer may be withdrawn from the danger of further exposure to the poison.

"Men working in anilin constantly seem to acquire a certain amount of tolerance to it; nevertheless, if the exposure is increased beyond the point of tolerance, there is apparently a cumulative effect, and symptoms of chronic poisoning result. After symptoms of poisoning have once manifested themselves, the patient is usually hypersensitive to the fumes.

"The treatment consists in fresh air, oxygen, and heart stimulants, especially camphorated oil. Prevention of subsequent exposure is imperative."

*

Eye Accidents in Pennsylvania.—Employers throughout the state have been more careful of the eyes of their workmen since the new Workmen's Compensation Act went into effect in Pennsylvania on January 1. It is probable that the number of cases of blindness from industrial accidents will be reduced to a fractional part of the number in previous years owing to the drastic provisions of the Workmen's Compensation Act

It has been the experience of officials of the Pennsylvania Association for the Blind, however, that many eyes that have been lost in industrial plants in this state were blinded through the carelessness of the employee rather than a failure of the employer to provide a proper safeguard. Since the first of the year the employers have been insisting upon the employees using the protection offered, and thus the number of accidents to the eye are doubtless being lessened.

✱

Health Insurance in California.—Through legislative action, there has been appointed in California a commission to study social insurance with special reference to sickness. This commission will work along lines similar to those indicated in the study which Massachusetts is now making of this problem.

✱

The American Association of Industrial Physicians and Surgeons.—More than one hundred physicians and surgeons engaged in the practice of industrial hygiene met at Detroit on June 12 and formed the American Association of Industrial Physicians and Surgeons. The organization which for some time has been in the process of formation is composed chiefly of men attached to large industrial and other corporations and to those whose interests lie in the same direction. The object is the study of industrial

hygiene in its various branches and the development of methods and the care of employees.

Officers were elected as follows: President, Dr. J. W. Schereschewsky, of Chicago; first vice-president, Dr. Francis D. Patterson, Philadelphia; second vice-president, Dr. R. M. Legge, Berkeley, Cal.; secretary and treasurer, Dr. Harry E. Mock, Chicago.

✱

Occupational Clinic to be Established.—Philadelphia soon will establish its first occupational clinic at the University Hospital for the purpose of investigating conditions under which persons coming to hospitals for treatment are employed. In this way the relation of disease to occupation can be studied, and recommendations made to safeguard the worker.

✱

Dr. Francis B. Patterson, head of the Pennsylvania State Industrial Safety Bureau, states that industrial accidents in the last year in the United States have killed almost 35,000 persons, injured almost 300,000, temporarily incapacitated 200,000,000 wage-earners and cost employers and employees \$250,000,000.

✱

More than \$9,000,000 was spent by individuals and corporations in New York state during the past year for the protection provided by the State Workmen's Compensation law.

Legal Decisions.

The Harrison Law Again.—The decision of the Supreme Court of the United States in the Case of *United States v. Jin Fuey Moy* has been criticized rather extensively by newspapers, health workers and others interested in the enforcement of anti-narcotic drug legislation as doing much to render the law valueless from a moral and health standpoint.

The court holds in this case that the words "any person not registered," as they are used in Section 8 of the Harrison law, mean *any person* in the class which by this section is required to register. That is, the words above quoted do not apply to every person in the United States.

The reason for this decision has not been thoroughly understood by the "laity" (speaking

from the standpoint of the lawyer). Justice Oliver Wendell Holmes, as able and profound a judge as sits in any court in the common law countries of the world, states the reason in his opinion. The Harrison Act is a tax measure. It is so entitled. To hold that it is a police power measure would mean that it is unconstitutional. If it is to stand at all it must stand as a revenue measure. The following passage from the opinion makes clear the court's position:

"The district judge considered that the act was a revenue act and that the general words 'any person' must be confined to the class of persons with whom the act previously had been purporting to deal. The Government, on the other hand, contends that this act was passed

with two others in order to carry out the International Opium Convention (38 Stat., pt. 2, 1919); that Congress gave it the appearance of a taxing measure in order to give it a coating of constitutionality, but that it really was a police measure that strained all the powers of the legislature, and that Section 8 means all that it says, taking its words in their plain literal sense.

"A statute must be construed, if fairly possible, so as to avoid not only the conclusion that it is unconstitutional. . . ."

Those who are dissatisfied with the court's opinion may find comfort in the knowledge that Justice Hughes and Justice Pitney dissent.



Rat Proofing Ordinance Upheld.—*City of New Orleans v. Beck* Louisiana Supreme Court, April 24, 1916.—In this case a New Orleans ordinance requiring that certain buildings be made rat-proof was held to be a reasonable and valid ordinance.

In commenting upon the law which confers general powers upon local boards of health to enact ordinances for the protection of the public health, the court significantly says:

"If a board of health has the power to order the vacation or demolition of any building when necessary for the protection of the public health it surely possesses the *lesser* power to order any building to be put in such condition as to prevent its becoming a focus of plague infection.

"The law makes the board of health the judge of the necessity for the protection of the public health and of the means to be adopted for that purpose."

Health officers will be further interested in the mention by this court of the following ancient maxim of law:

"*Salus populi est suprema lex*, a maxim meaning, 'The health of the people is the first law.'" (35 Cyc. 714.)"

Kansas Supreme Court Holds that City Ordinance May Impose a Higher Standard for Milk Sold in the City than Required by the State Regulation.—The State Board of Health of Kansas, by authority of a State law, established certain standards for milk sold in the State. The city of Kansas City, Kans., adopted an ordinance establishing a higher standard for milk sold in the city.

A dealer was convicted of selling milk which was below the standard required by the city ordinance. He asserted that the city ordinance was void because it was in conflict with the State regulations, but the Supreme Court of Kansas decided that the city ordinance was valid.

In short, the power of the State Board of Health to provide standards of milk sold is not an exclusive power. In the words of the court:

"It is well settled in this State that, where power is conferred upon cities to enact ordinances for the preservation of peace and good order within the city or for the preservation of the health of its inhabitants, it may be exercised, although the legislature has provided State regulations on the same subjects."

Of course the local authorities are not hereby authorized to do anything inconsistent with the state wide regulations. An ordinance reducing an abrogating state legislation or regulation would be inconsistent and void but, in accordance with this opinion, an ordinance increasing for the city the stringency of local regulations may be regarded as thoroughly consistent. The ordinance here involved also made penalties for violation more severe than those imposed by state law.

The case is *Kansas City v. Heure*, 153 Pacific Reporter 548. This decision is plainly correct and the same result would probably be reached in any jurisdiction under analagous circumstances.

Personal Notes.

At the sixty-seventh annual meeting of the American Medical Association, held in Detroit during the week of June 12, the following officers of the section in public health and preventive medicine were elected:

Chairman, Dr. Otto P. Geier, of Cincinnati;

vice-chairman, Dr. Ernest C. Levy, of Richmond, Va.; secretary, Dr. A. M. Harvey, of Chicago, Ill.; orator, Dr. W. S. Rankin, of Raleigh, N. C.; delegate, Dr. W. C. Rucker, of Washington, D. C.; alternate, Dr. J. N. Hurty, of Indianapolis, Ind.

Dr. George P. Paul of Boston has started for Trinidad in the service of the International Health Commission.

✱

Dr. Montgomery E. Leary of Rochester, N. Y., was reelected president of the New York State Sanitary Officers Association at the Annual Meeting held in Saratoga Springs, June 10.

✱

Mr. E. B. Johnson has been appointed Agent for the Board of Health of Watertown, Mass.

✱

Arthur A. Eisenberg has been appointed Director of the Pathological Laboratories of the St. Vincent Charity Hospital of Cleveland, Ohio.

✱

Prof. Selskar M. Gunn has resigned as Director of the Division of Hygiene of the Massachusetts State Board of Health. Dr. Lyman H. Jones has been appointed by Commissioner A. J. McLaughlin to succeed him.

✱

The following persons were elected to mem-

bership in the American Public Health Association, June 19, 1916:

Dayton J. Long, M. D., Piedmont, West Virginia. Board of Health.

George H. Jennings, M. D., Jewett City, Conn.

Wm. F. Allison, Seattle, Wash. Professor of Municipal and Highway Engineering.

George H. Th. Sparling, M. D., Newcastle, Wash. County Health Officer.

Isaac Mayhugh, M. D., Barstow, Texas. County Health Officer.

J. T. Horton, M. D., Quanah, Texas. Formerly County Health Officer.

Henry E. Berger, Jr., Board of Health, Wellesley, Mass.

George L. Affelbach, M. D., Chicago, Ill. Illinois Department Factory Inspection.

James Alner Tobey, Assistant Health Officer, Summit, N. J.

Montgomery M. Harmen, M. D., Eustis, Fla.

Irs. C. Harman, A. B., M. D., Chicago Heights, Ill.

Will. H. Aikman, Natchez, Mississippi. County Health Officer.

Charles P. Caldwell, M. D., Chicago, Ill.

Current Public Health Literature.

AMERICAN.

Albany Medical Annals.

XXXVII. June.
Medical Expert Testimony. Alden Chester.

American City, The, New York.

XIV. May.
Public Comfort Stations. W. P. Gerhard.
Hand Flushing—Its Place in the Street Cleaning Field. R. W. Parlin.

American Journal of Tropical Diseases and Preventive Medicine, New Orleans.

III. June.
The Employment of Ray Poison as a Measure for Preventing and Exterminating the Plague. Toyojiro Kitano.

Boston Medical and Surgical Journal.

CLXXIV. June 15.
The Physician and the Prevention of Industrial Accidents. Herbert L. Cronin.

Engineering Record, New York.

74. June 17.
Abstracts of Papers Presented at the 36th Annual Convention of the American Water Works Association.

Interstate Medical Journal, St. Louis.

XXIII. June.
Alcohol and Narcotics From the Psychological Point of View. G. T. W. Patrick.

The Hereditary Transmission of Degeneracy and Deformities by the Descendants of Alcoholized Mammals. Charles R. Stockard.

Alcoholism, A Symptom. William A. White.

The Diagnosis of Delirium Tremens. Charles E. Seeleth and Arthur F. Beifeld.

Alcohol and Art. Arthur C. Jacobson.

The Influence of Alcohol on the Progeniture. Alfred Gordon.

A Brief Consideration of Some Mental Characteristics of the Narcotic Habitue and a Suggestion for a Feature in Management. Henry Beates, Jr.

Alcoholism and Feeble-Mindedness. Henry H. Goddard.

The Drug Traffic and Its Victims. Burdette G. Lewis. Alcohol and Narcotics. Robert T. Morris.

The Pathogenesis of Alcoholism and Narcotism and the Treatment of Their Causes. Tom A. Williams. Medical Studies of Alcohol Half a Century Ago. Henry O. Marcy.

The Rational Consideration of Narcotic Addiction. Ernest S. Bishop.

The Cigarette as Related to Moral Reform. D. H. Kress.

Journal of the American Medical Association, Chicago.

LXVI. June 3.

The Value of Anaphylaxis in the Treatment of Gonorrheal Infections. Louis D. Smith.

A Study on Food and Fuel Value of the Dietary at the New York Municipal Sanitarium. R. J. Wilson and W. L. Rathbun.

June 17.

- Some of the Larger Problems of the Medical Profession. Rupert Blue.
 Dispensary Abuse and Certain Problems of Medical Practice. J. Whitridge Williams.
 Trench Foot Tetanus. G. G. Davis and J. J. Hilton.

Journal of Bacteriology, Baltimore.

I. May.

- Studies on Aerobic Spore-bearing Non-pathogenic Bacteria. Part I. Introduction. J. B. Lawrence and W. W. Ford: Spore-bearing Bacteria in Milk.
 The Number of Colonies Allowable on Satisfactory Agar Plates. Robert S. Breed and W. W. Dotterer.
 A Modification of the Hygienic Laboratory Method for the Production of Tetanus Toxin. H. L. Wilcox.
 A Method of Anaerobic Plating Permitting Observation of Growth. H. M. Jones.
 Testicular Infusion Agar. A Sterilized Culture Medium for the Gonococcus. I. C. Hall.

Journal of Infectious Diseases, Chicago.

18. June.

- Immunologic Studies of Hodgkin's Disease. J. J. Moore.
 A Study of Gas-Production by Different Strains of Bacillus Abortivo-Equinus. E. S. Good and L. S. Corbett.
 A New Culture Medium for the Isolation of Bacillus Typhosus from Stools. J. E. Holt-Harris and Oscar Teague.
 Studies in Diphtheria in Cleveland. R. G. Perkins, M. J. Muller, H. O. Ruh.
 A New Differential Culture Medium or the Cholera Vibrio. Oscar Teague and W. C. Travis.
 A Variation of Gemmation of Blastomyces Dermatitidis in the Tissue Lesion. H. W. Wade.
 The Coexistence of Antibody and Antigen in the Body. B. S. Dinzer.
 An Improved Brilliant-Green Culture Medium for the Isolation of Typhoid Bacilli from Stools. Oscar Teague and A. W. Clurman.
 A Method for Preserving Typhoid Stools for Delayed Examination, and a Comparative Study of the Efficacy of Eosin-brilliant-green Agar, Eosin-methylene-blue Agar, and Endo Agar for the Isolation of Typhoid Bacilli from Stools. Oscar Teague and A. W. Clurman.

Nurse, The, Jamestown, N. Y.

V. July.

- Tuberculosis: Part VI. Daily Routine—Treatment of Symptoms—Care of Advanced Cases—Summary. Thomson Frazer.
 Ambulance Duty with the Expeditionary Force in Mexico.

BRITISH EMPIRE.

British Medical Journal, London.

May 13.

- Importance of Method in Isolation of Pathogenic Organisms of Typhoid Group from Feces. C. H. Browning and L. H. D. Thornton.
 Examination of Fifty Dysenteric Convalescents for Carriers. J. A. Arkwright, W. Yorke, O. H. Priestly, W. Gilmore.
 Easy and Rapid Method of Doing Widal's Reaction for Typhoid. A. C. Coles.

May 20.

- Excystation of Entameba Histolytica as Indication of Vitality of Cysts. W. J. Penfold, H. M. Woodcock, A. H. Drew.
 Amebic Dysentery in Man Who Never Left England. C. Worster-Drought and D. D. Roseworn.
 Simple Portable Refrigerating Box and Its Use as Temporary Incubator in Military Work. S. Delépine.

Journal of State Medicine, London.

XXIV. June.

- The Rapid Production of Antidysenteric and Antimeningococci Sera. Simon Flexner.
 Electrical Treatment of Milk for Infant Feeding and the Destruction of Bacillus Tuberculosis. J. M. Beattie and F. C. Lewis.
 The Care of Children under the School Age. David Forsythe.

- What People Should Know about Cancer. Francis C. Wood.
 The Nurse and the Mental Patient: Part III. Anne E. Perkins.
 The Role of the Visiting Nurse: VII. The Tuberculosis Nurse. Stella Fuller.

Journal of the National Dental Association, Huntington, Ind.

III. May.

- Dental Research, Its Place in Preventive Medicine. Charles H. Mayo.
 Some Evidences of the Importance of the Dental Path as a Source of Serious Localized and General Infections. T. B. Hartzell.

New York Medical Journal.

CIII. June 10.

- Epidemic Pneumonia in the Tropics. J. H. Egbert.
 June 17.
 Camp Sanitation. F. W. Huntington.

Public Health Journal, Toronto.

VII. June.

- Sewage Disposal by the Activated Sludge Method. T. Chalkley Hatton.
 The Periodic Medical Examination. George Elliot.

Social Hygiene, Baltimore.

II. July.

- State-wide Education in Social Hygiene. William T. Foster.
 Sex in Life. D. B. Armstrong and Eunice B. Armstrong.
 How Shall we Teach?
 Sex Education in the Home and High School. James E. Peabody.
 Social Hygiene in Settlement Work. Walter Clarke.
 Syphilis and Society. Hugh Cabot.
 The Prevalence and Prevention of Syphilis. Edward B. Vedder.

United States Public Health Reports.

XXXI. June 2.

- Public Health Administration in Florida. Carroll Fox.
 June 9.
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THE IMPROVEMENT OF CANCER MORTALITY STATISTICS IN THE UNITED STATES.

CURTIS E. LAKEMAN,

Executive Secretary, American Society for the Control of Cancer.

Read before the Vital Statistics Section of the American Public Health Association, Rochester, N. Y.,
September 9, 1915.

AT A meeting of the Executive Council of the American Society for the Control of Cancer held on February 7, 1914, Mr. Frederick L. Hoffman, Chairman of the Committee on Statistics, introduced the following resolution which was unanimously adopted:

"Resolved, That the Executive Committee of the American Society for the Control of Cancer respectfully suggests to the Director of the United States Census, that the Division of Vital Statistics be instructed to publish hereafter, in the annual volume on mortality statistics, a more detailed statement of the deaths from cancer and other malignant tumors, as reported for the registration area of the United States and in accordance with the details as given in the second revision of the Manual of the International List of Causes of Death, pages 63-66 inclusive."

This suggestion received favorable consideration and was perhaps the initial impulse in the project for a special

report on the cancer mortality of 1914, which was soon afterward ordered and planned by the former Director of the Census, Hon. William H. Harris, and is now being completed under his successor, Hon. Sam. L. Rogers. In an announcement of the proposed plan the Director stated that the seven titles, numbers 39 to 45 inclusive, under which deaths from cancer and other malignant tumors are grouped and reported in the International List of Causes of Death, would be subdivided for the calendar year 1914 into twenty-nine titles of particular organs and parts of the body affected, and the figures published accordingly in a special monograph. The detailed list of titles adopted for this purpose was given as follows:

39—Cancer and Other Malignant Tumors of the Buccal Cavity

- 39a—Cancer of the lip
- 39b—Cancer of the tongue
- 39c—Cancer of the mouth
- 39d—Cancer of the jaw
- 39x—Others

40—Cancer and Other Malignant Tumors of the Stomach, Liver

- 40a—Cancer of the pharynx
- 40b—Cancer of the esophagus
- 40c—Cancer of the stomach
- 40d—Cancer of the liver and gall bladder

41—Cancer and Other Malignant Tumors of the Peritoneum, Intestines, Rectum

- 41a—Cancer of the mesentery and peritoneum
- 41b—Cancer of the intestines (except rectum)
- 41c—Cancer of the rectum and anus
- 41x—Others

42—Cancer and Other Malignant Tumors of the Female Genital Organs

- 42a—Cancer of the ovary and fallopian tubes
- 42b—Cancer of the uterus
- 42c—Cancer of the vagina and vulva
- 42x—Others

43—Cancer and Other Malignant Tumors of the Breast

44—Cancer and Other Malignant Tumors of the Skin

45—Cancer and Other Malignant Tumors of Other Organs or of Organs not Specified

- 45a—Cancer of the larynx
- 45b—Cancer of the lung and pleura
- 45c—Cancer of the pancreas
- 45d—Cancer of the kidneys and suprarenals
- 45e—Cancer of the prostate
- 45f—Cancer of the bladder
- 45g—Cancer of the brain
- 45h—Cancer of the bones (except jaw)
- 45k—Cancer of the testes
- 45x—Others

After seeking the advice of leading American students of the cancer problem the Census Bureau began the collection of data for the special report

by sending a query letter to thousands of physicians who had during 1914 certified cancer as a cause of death. This letter stated that the Bureau proposed to publish two sets of statistics covering the subject of deaths from cancer and other malignant tumors, (1) statistics of deaths in which the diagnoses were based on clinical findings, and (2) statistics of deaths in cases where the diagnoses were confirmed by autopsies or where surgical operations had been performed. The practitioner was accordingly requested to complete the record of the case on the transcript with reference to the character of the diagnosis, and to the exact seat of the disease. Over 35,000 of these query letters were sent out, and 60 to 70 per cent. of replies were received. An incidental result of this work soon appeared in the extent to which full details were given on the 1915 certificates and transcripts, although the special inquiry did not apply to deaths subsequent to December 31, 1914.

As the returns began to accumulate the Census Bureau prepared instructions for the assignment of terms used on the certificates to the new titles, and for editing the completed transcripts in accordance with the proposed plan of compilation. On February 17, 1915, the Director submitted to a conference of cancer students, a tentative plan of classification according to certainty or uncertainty of diagnosis. This conference included representatives of the American Society for the Control of Cancer, the American Association for Cancer Research, the George Crocker Special Research Fund

of Columbia University, the Harvard Cancer Commission, and the Barnard Free Skin and Cancer Hospital of St. Louis. In a letter transmitting the conclusions of this committee to the Director of the Census on March 8, 1915, the instructions for editing the transcripts were for the most part approved, the principal exceptions being as follows:

(1) That all diagnoses of inaccessible cancer based on clinical findings alone should be referred to the "uncertain" class regardless of any strength of assertion by the physician that the diagnosis was correct.

(2) That in general the term "reasonably certain" be substituted for the term "certain," on the ground that only microscopic examination can bring certainty to a diagnosis.

(3) For this reason it was suggested that the returns for microscopic findings be separately stated. (This, however, has not proved feasible.)

Thereupon the Division of Vital Statistics prepared tentative drafts of five tables for the proposed report and submitted these to an advisory conference held in New York on May 27, 1915, consisting of the representatives of the organizations already named and several well-known statisticians. After extended discussion, four of the tables were approved with certain modifications calculated to reduce the volume of clerical labor and printing. The fifth table, relating to the occupational phase, was recommended to be omitted entirely, owing to the unsatisfactory nature of the returns likely at present to be had in this field.

As agreed upon, Table I will show deaths from all forms of cancer according to certainty of diagnosis and by sex and quinquennial age groups after 35 for the registration area, the registration states (divided into urban and rural), registration cities in other states and all registration cities, provided that at least 100 deaths occurred during the census year in the particular area to be published. Figures for white and colored will be shown separately for such counties and towns as have a colored population of 10,000 or at least 10 per cent. of the total.

Table II will present deaths from cancer according to the seat of the disease, accuracy of diagnosis, and sex, for the registration area and all the usual subdivisions. Thirty-four columns are provided to cover the totals and subdivisions of the seven main titles 39-45.

Table III is the site and age table, showing cancer deaths by exact seat of disease, sex, color and nativity in quinquennial age groups for the registration states exclusive of North Carolina.

Table IV will show cancer deaths (all forms) by conjugal condition, sex, color and nativity in quinquennial age groups over 35 for the registration states exclusive of North Carolina.

As thus planned the special report is rapidly taking shape and may be expected to appear early in 1916. The amount of additional labor thereby thrown upon the Division of Vital Statistics, however, has been great and possibly those interested in cancer statistics will have to share the responsibility for the delayed publica-

tion of the regular annual report for 1914. It has been found necessary in preparing the cancer returns for tabulation to punch each cancer card in duplicate, adding the requisite code symbols for the exact site of the disease, for certainty or uncertainty of diagnosis, surgical intervention, autopsy, clinical findings, etc. Fortunately, the codification of this additional information on the cards can be continued for subsequent years without undue strain on the resources of the federal office. This means that a vast body of detailed information in regard to cancer in the United States registration area will be stored away each year in the form of punched cards ready for tabulation whenever the demand shall justify the additional labor and expense of publication.

It is evident from the foregoing review that the officials of the Census Bureau are entitled to the sincere congratulations of scientific students of the cancer problem the world over for their zeal in planning and carrying out this notable contribution to the statistical investigation of the chief problem of medical biology. It should be recorded that the project, as it took shape in the Census Bureau, went far beyond what was in mind when the Cancer Society offered its resolution of February, 1914. In justification of this laborious and expensive undertaking and to substantiate an appeal for coöperation in continuing the work thus begun, a few of the reasons why the detailed registration and publication of cancer mortality is necessary and desirable may be suggested.

In the first place it is essential to bear in mind the importance of the statistical method in the study of the ancient and continuing problem of the etiology of cancer. Observations of human subjects under varying racial, geographic, topographic, and climatic conditions, as well as studies of apparently analogous diseases in plants and animals have already brought out important facts bearing on the nature and causes of the various forms of malignant disease. The value of statistical inquiries, broadly defined, as a method to be relied upon side by side with experimental and clinical research, is illustrated by the work of the Imperial Cancer Research Fund. Upon the organization of this institution some twelve years ago, steps were immediately taken to procure comprehensive statistical observations and reports covering the entire British Empire. The wide diversity of countries, climates and races united under one governmental influence gave extraordinary facilities for such an undertaking and the results have in a large measure fulfilled the promise implied in the circumstances. Under the guidance of a statistical committee including such well known men as Dr. Arthur Newsholme, Dr. John Patten, Dr. T. H. Craig-Stevenson, Sir Arthur Whitelegge and others, the British institution has collected and published data which have notably advanced our knowledge of cancer. It is, perhaps, chiefly due to these studies that chronic irritation is now recognized as one of the chief conditioning factors in the occurrence of this disease. The investigations soon disclosed such facts

as that external cancer of the abdomen is common among natives of Kashmir who receive burns from the overheated charcoal warming-pan known as the kangri basket. In China the women eating cold rice at a second table escape the cancer of the esophagus which is common among men who eat the rice hot. In the Nile valley cancer of the foot is frequently observed among natives exposed to injury by thorns. Cattle in India exhibit cancer of the horn on that side to which by immemorial custom the harness is attached but not on the other horn. Many of these habits and customs among widely separated peoples have been aptly characterized as "natural experiments," in which human beings unintentionally subject themselves to observation under special conditions and, upon comparison with "control" races elsewhere, clearly disclose some of the causal factors in the occurrence of malignant disease (4). In a broad sense an example of the statistical method, these observations have given a stimulus to the investigation of old and new forms of irritation, resulting in a growing collection of data on the genesis of cancer under such conditions as scar tissue, injuries, burns, gallstones, hot food, excessive smoking, decayed teeth, exposure of the operator to burns from the X-ray machine, etc. Moreover conclusions resulting from such studies have in many cases been verified under artificial conditions in the laboratory, the combination of statistical and experimental methods constantly advancing the knowledge of this disease.

Another application of the statistical

method which was at first considered promising is the special cancer census such as that taken in Germany on October 13, 1900, when an attempt was made to obtain information by circularizing physicians as to all existing cases of the disease. A close examination of results of the special census, particularly when tried afterward in Spain, Denmark and Sweden, has convinced many students that this method is practically useless. In the German census three times, and in the Spanish census twenty-five times as many deaths occurred as there were cases reported. In Spain 3 per cent., in Germany 55 per cent., in Sweden 97 per cent. and in Hungary 99 per cent. of the doctors replied, but in Sweden and Denmark at least one-half the replies were negative. In Hungary the return of the blank was made compulsory, whereupon three quarters of the doctors replied that there were no cases under their observation, doubtless the easiest way to avoid the penalty (5) (6). If, as in Baden, the cancer census was extended to cover a whole year, it needlessly overlapped the regular mortality report of the statistical office. Yet even in the Baden census the number of cases reported only slightly exceeded the number of deaths during the year instead of being triple or double that number as might reasonably be expected. Moreover, there was great danger of errors in tabulation and necessity for elaborate administrative provisions, when the time of the census was at all extended, to prevent duplication of reports by different doctors treating the same persons. These considerations led

the English students, at least, to reject the special census and to maintain that "the separation of statistics of cancer from those of the general mortality has not beneficially affected the results obtained (6)."

As providing a specific precedent for the work of the United States Census Bureau now in hand, it should therefore be noted that the English authorities have from the beginning maintained a policy of coöperative effort which strongly emphasizes the importance of studying and improving the regular national mortality statistics. The leading independent students and investigators in Great Britain have constantly avoided undertaking any investigations which would overlap with the duties of the Registrar General's office and have confined themselves to special inquiries "likely to advance the development of the national statistics or assist in their interpretation (3)." In particular, effort has been made to have the national statistical office publish more detailed data, especially figures showing the incidence of cancer in different parts of the body. For a long time it was pleaded that the expense would be out of proportion to the benefits which would follow from tabulating the several organs and sites of the body separately, and even after the policy had been agreed upon ten years ago, it could not be carried out until 1909. Beginning with that year, however, the reports of the Registrar General's office exhibit the figures of cancer analyzed in great detail according to organs and parts of the body. For several years the figures for the

period since 1901 were published in such detail as to show the incidence on separate organs for each sex at different age periods, the increase reported for separate organs and for separate age periods as well as the curves of incidence characteristic for separate organs at separate age periods. In these first detailed reports a table was used which included 48 organs and parts for males and the same number with the appropriate changes for females. In 1911 when the Registrar General adopted the International List of Causes of Death, improved the methods of collecting statistics for England and Wales, and changed the form of his annual report, the special classification and study of cancer was continued under twenty-five sub-titles of titles 39-45 for males and twenty-six sub-titles for females (1). The list of organs and parts of the body now adopted by the Census Bureau is similar to that used by the Registrar General and it is to be anticipated that with the coöperation of state registration officials at least the foundation can be laid for studies of the American data as fruitful as those based on the English reports.

A few examples may be given to illustrate the advance in the knowledge of cancer which may reasonably be expected to result from more accurate and detailed statistics. Curves in which all cases of cancer are considered together give useful information, but the importance of the statistical approach to the problem is evident as soon as curves are made, not only for each sex at the several age periods but also for each organ or site affected. It

is elementary that upon the construction of such curves the greater frequency of cancer among women is at once seen to be due to cancer of the breast and uterus. When curves are completed for all the various organs for each sex at the several age periods, it appears that the rates of mortality for different organs at different ages are similar for the two sexes while the separate organs vary widely among themselves. Some organs show a curve which rises to a maximum only at the end of life, others a curve with the maximum earlier followed by a fall to the end of life, and still other organs exhibit two maxima at different age periods (4). Whatever the exact significance of these differences there can be no question of their importance and their full elucidation will undoubtedly throw further light on the nature of the disease. Even if statistics alone are unable to explain these phenomena they at least lead to the inference that more than one cause is at work in the etiology of cancer, which is in itself an important conclusion.

Another striking example is the comparison, as between the two sexes, of cancer incidence at various sites along the alimentary canal. From the English figures it has been possible to construct curves of relative frequency for the several parts of this system. These curves are found to cross at the stomach in both sexes. Above the stomach cancer is more common in the male, below it more common in the female. This has been found to hold true in both the national statistics and in special studies of hospital statistics made by the Imperial Cancer Re-

search Fund. It is conceived that "this circumstance may not be without relation to the different habits of the two classes, the male irritating the upper half of the canal by smoking, alcohol, gulping his food, etc., more than the female who is, however, more prone to the chronic irritation of constipation" (4). Whatever the final deduction, it is clear that such studies, based on the detailed statistics of the national registration office, have already brought the world nearer to a scientific understanding of cancer.

A chief source of error and confusion in efforts to solve the cancer problem has been the tendency to regard it as a single definite disease. It is becoming increasingly apparent that the term cancer covers a large number of quite different diseases which exhibit differing histories and origin, run different courses and offer varying prospects of cure as they affect different organs and tissues. In other words modern pathology is apparently leading us ever further away from the possibility of explaining cancer as a single entity. A striking instance of this is found in the studies of Rous of the Rockefeller Institute on the transmission of chicken sarcoma by means of a filterable agent. The investigations disclosed three different forms of this disease and a separate agent for each form, which would not transmit either of the other forms. This fact in connection with a minute experimental study of one branch of the subject indicates how great may be the complexity of cancer in human beings. Progress in the experimental field is already more encouraging since cancer

students have recognized that they are dealing with a group of diseases, and these considerations indicate that similar importance must attach to the separate statistical study of the various forms of cancer in human beings, as they affect different organs and parts of the body.

In Frankfort-on-the-Main, Germany, the requirement of site analysis has been fulfilled and deaths from cancer have for years been classified in accordance with the parts of the body primarily affected. As a result, statistical treatises on cancer beginning with that of King and Newsholme in 1893 include extended reference to the Frankfort figures as a rare source of necessary data for the scientific study of the disease. The notable paper of Greenwood and Wood before the Royal Society of Medicine in 1914 to which Professor Willcox made reference before this section last year likewise emphasized the importance of detailed analysis. "We may add," say the authors in their concluding sections, "that although we have discussed here the problem which is of most popular interest, namely changes in the general rate of cancer mortality, we conceive that a more fruitful line of research is to analyze the local and secular changes in the rates of different sites in view of their largely independent variability (3)." This painstaking study depends for many of its conclusions upon an analysis of English and Swiss data for which, at the present time, there can be no comparison in the material available in this country. Their study of the Swiss figures so far as they go, cause the authors to

think that "the scientific importance of comparison between the rates for all forms of cancer is less than the general public or even the medical profession as a whole suppose (3)." This belief led Greenwood and Wood to support the policy of the Registrar General of publishing separate tabulations of the site rates and to advocate the carrying of this tabulation even further than has yet been done, for instance, by the introduction of tables showing the site rates for some of the larger administrative divisions.

Turning to the much debated question of the reality of the recorded increase in cancer mortality and without taking sides on that classic issue, it is only necessary to point out that this problem with its important professional, scientific, and popular implications cannot be satisfactorily settled without analysis of the data by sex, age and site. Study of the English figures has shown that the increase is not uniform for the different parts of the body while for some organs, notably the uterus, an actual fall has been persistently evident since 1902. It was one of the fundamental tenets of the argument of King and Newsholme that the rates for inaccessible sites have markedly increased. Greenwood and Wood, in the paper already referred to, made a vigorous onslaught against this view, showing that on the contrary "the rate of increase is not uniformly greater in the case of inaccessible sites, that in particular the rates for the tongue in males and for the breast in females have advanced in a manner inconsistent with the general validity of the proposition as applied

to all forms of cancer, and that in consequence the attribution of the great increase in certain other inaccessible site rates, to improved diagnosis becomes arbitrary (3)." Without assuming to pass upon the merits of these subtle and weighty arguments it is sufficient for the purpose of this paper to inquire how far such refined and critical reasoning, based on the detailed tabulation of site rates, may be expected to proceed in America, if the war suspends progress in such studies in European countries. It is a welcome augury for the advance of statistical research in this field in America that the Census Bureau has undertaken to supply cancer data in such full detail.

Enough has been said to indicate the value of the statistical method in relation to the cancer problem, the importance of detailed statistics with regard to sex, age, race and site of attack of this complex and manifold disease, and the advantages of improving the national statistics as compared with the method of the special census. Those suggesting the changes in the reports of the Census Bureau do not overlook the wide range of information already obtainable (2). It should be remembered that the present annual reports, arranged according to the International List, include tables showing the following:

(1) Deaths from cancer (all forms and all ages) in the registration area, registration states, registration cities in other states and the urban and rural parts of registration states, according to color.

(2) Deaths from all forms of cancer

and seven sub-titles in the registration area, its most important subdivisions and the cities and rural districts of each state, separated, where necessary, according to color.

(3) Deaths from all forms of cancer and the seven sub-titles in the registration area by sex and five-year age groups.

(4) Deaths from all forms of cancer and seven sub-titles in the registration area, all registration states, and each registration state, by ten-year age groups.

(5) Deaths from all forms of cancer in each city of 100,000 and over, by ten-year age groups.

(6) Death-rates in the registration area (seven titles).

(7) Death-rates (one title) in the registration area and sub-divisions according to color.

(8) Death-rates (seven titles) in cities and rural districts of each registration state.

These tables, so far as we are informed, will be continued without change in future reports. What students of cancer most desire to supplement this information is (1) greater detail in stating the number of cases by organs and parts affected, and (2) a higher degree of validity of the returns, that is to say, some effort to separate cases depending upon surgical and microscopical diagnosis from the more uncertain diagnoses depending on clinical findings alone. It is perhaps more than we can reasonably ask that all this laborious analysis should be made by the Census Bureau every year. It may well be, however, that as in the case of the English volumes,

the annual mortality reports will contain hereafter a more extended discussion in the prefatory pages in which special diseases are given topical treatment. Here there will be opportunity to publish the results of such detailed analysis of the new figures as may regularly be found feasible. It is to be hoped, though, that at periodic intervals, the Washington office may be able to repeat its project of publishing a special monograph on this disease.

At this point it may be appropriate to call attention to the advantages of even closer coöperation between the state registration offices and the Federal Bureau to the end that the registration of deaths, not only from cancer but from other diseases, may be further perfected. In particular it is hoped that a plan may be worked out for the more prompt and complete correction of death certificates. Doctor Wilbur has already suggested the appointment in each state registration office of an agent of the Census Bureau who would be authorized to send out uniform query letters on the stationery of the federal department. The advantages are obvious. Under the present plan it may be months before the transcript of a death certificate reaches Washington and is taken up in the course of business for the necessary querying and correction. By that time the details of the case may well have escaped the mind if not the records of the medical attendant. Under the proposed plan the necessary query letters can be sent to the physician within a comparatively short time of the death of the

patient and the information promptly secured by the state official acting as an agent of the federal department. The expense of postage, which in many cases is considerable, would be spared to the state office which would then have to bear merely the cost of supervisory and clerical work. From the federal point of view the suggested procedure is justified by the fact that the information will be acquired primarily for federal purposes, namely, the improvement of the national mortality statistics. To the public at large the gain lies in the result that the completion and correction of death certificates would be carried out with a degree of uniformity and certainty throughout the country that will never be possible under varying administrative conditions in the many state jurisdictions.

Whether or not this plan is adopted, it is to be hoped that state registration officers will coöperate to maintain the improvements now secured in cancer registration by querying and by urging the regular reporting of full details on every certificate of death from cancer, particularly (1) the exact site of the disease, and (2) whether the diagnosis was based on clinical findings or was confirmed by autopsy, surgery, or microscopical examination. Wherever state officers already conduct much routine correspondence for the correction of death certificates the additional labor necessary to obtain this information would not appear to be prohibitive. There is appended as a suggestion a special inquiry letter suggested by Doctor Wilbur for this purpose.

It is also recommended that state and local statistical offices use the new detailed classification in tabulating and reporting deaths from cancer. Uniformity in this respect is desirable and the Census Bureau classification, as given at the beginning of this paper, seems well designed to meet the reasonable demands of cancer students while keeping within the limits of practicability.

A word of warning is necessary to prevent the possible suspension of still more detailed and valuable independent local studies. It is not meant to suggest that the improvement of national mortality statistics makes unnecessary any special inquiries analogous to epidemiological studies of other diseases. Such a study of cancer was made some years ago in New York by the State Institute for the Study of Malignant Disease at Buffalo in coöperation with the State Department of Health, and the example has been followed in some other states. These inquiries involve the asking of numerous questions as to parentage, occupation, case and family history, factors of irritation, diet, alcohol, tobacco, and similar details quite too numerous to be covered in a national query letter for the special purpose of improving the Census Bureau statistics. So far as they go these special studies are of definite value when properly done, and it would be regrettable if in any case they were to be discontinued under the impression that the national government had undertaken anything so extensive.

We feel sure that the members of this section as well as statisticians and students of the cancer problem, generally, will join in congratulating the Bureau of the Census on the execution of its notable contribution to the statistical study of malignant disease. Whatever coöperative arrangements may eventually be adopted, and whether or not the Federal Office is able to repeat its special report on cancer, it is clear that a definite gain has already been made. The Census Bureau will continue each year to punch its cards with reference to the site of the disease and the certainty of diagnosis. It is to be expected that state officers will do their part in one way or another to provide these details on their original cancer death certificates. By such coöperation it will be possible permanently to record and study the enormous body of American data on cancer mortality in a manner promising substantial scientific results. It will be gratifying if the present widespread interest in the cancer problem can be made the occasion of introducing any improvements in the administrative machinery of American vital statistics, and it can hardly fail to follow that this branch of public health work in our country will profit by the exceedingly careful study that has recently been given to the statistics of this particular disease, involving as it has, correspondence with over 30,000 American physicians upon whose coöperation and efficiency improvement in the registration of causes of death so largely depends.

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Department of Health of the State of New York.

SPECIAL INQUIRY ON DEATH FROM CANCER.

DEAR DOCTOR:

Great interest is now being taken in the subject of cancer mortality and, as you are doubtless aware, a special investigation of the subject was lately undertaken by the United States Bureau of the Census at the instance of the American Society for the Control of Cancer. Among the inquiries were, questions intended to elicit the amount and quality of the evidence available for the diagnosis of cases reported, this giving an important bearing upon the question of the actual or only apparent increase in mortality from this cause.

It is desired to continue the collection of this information for the current year, and I shall therefore greatly appreciate your assistance if you will kindly detach and return the

slip below (by means of inclosed stamped envelope).

Yours very truly,

HERMANN M. BIGGS,
Commissioner.

By CRESSY L. WILBUR,
Director, Division of Vital Statistics.

PLEASE DETACH AND RETURN STATEMENT BELOW.

Dist. No..... Reg. No.....
Name..... Date of death.....
Was diagnosis entirely clinical?.....
Operation?.....
Microscopic examination?.....
Postmortem findings?.....
Exact nature of neoplasm?.....
Part of body first affected?.....
Date.....191.. (Signed)..... M. D.

DISCUSSION.

RICHARD C. LAPPIN,

Chief Statistician for Vital Statistics, Bureau of the Census.

At the request of the Executive Committee of the American Society for the Control of Cancer that the Bureau of the Census present statistics of cancer and other malignant tumors in greater detail than heretofore shown in the annual mortality reports, the Director of the Census on October 17, 1914, decided that the Bureau of the Census would publish a monograph on the deaths that occurred in the registration area during the calendar year 1914 reported as due to malignant growths.

As indicated in Mr. Lakeman's paper, the Bureau subdivided the seven International titles covering this subject so that statistics will be presented showing the mortality from cancer and other malignant tumors, classified according to location, under 29 separate headings. A member of the Society suggested that the two sets of statistics to be presented distinguish: (a) growths of which the malignant nature and existence were reasonably certain on the basis of autopsies, surgical operations, microscopical

examinations, or accessibility to observation by reason of exposed situations; (b) those of which identification as malignant tumors was uncertain, that is, internal cancers and other malignant growths diagnoses of which were based on clinical findings only.

The Director of the Census instructed the Division of Vital Statistics to estimate how great a percentage of the transcripts, as received by the Census, contained the desired information. It was estimated that at least 50,000 deaths would be reported during the year 1914 in the registration area as due to cancer and other malignant tumors. About 2,000 transcripts from several registration states were examined and it was found that in less than two per cent. of the cases was the fact of autopsy mentioned, and about nine per cent. of the transcripts contained the information that surgical operations had been performed; in practically no cases was it stated that the diagnosis was based on clinical findings. Using the number of deaths in 1913 as a criterion, it was estimated that about 8,500 deaths would be reported as due to cancer or malignant tumors of the buccal cavity, skin and breast, all so situated that no mistake would be probable in diagnosis and which, therefore, could be classified as of reasonably certain malignancy. Thus it appeared that no record of autopsy or surgical operation would be found in upward of 35,000 cases and that if the Bureau of the Census were to secure this information it would be necessary to communicate with each attending physician and ask whether the diagnosis was based on clinical findings, whether an autopsy had been held, or a surgical operation performed.

When the result of the examination of the transcripts was made known to the Director, he instructed the Division of Vital Statistics to prepare a form letter to be sent to physicians requesting the data described above. A copy of this letter follows:

Dear Doctor:

At the request of the American Society for the Control of Cancer the Bureau of the Census has decided to publish two sets of statistics covering the subject of deaths from cancer and other malignant tumors:

(a) Statistics of deaths in which the diagnoses were based on clinical findings.

(b) Statistics of deaths in which the diagnoses were confirmed by autopsies, or in which surgical operations were performed.

Will you kindly examine the accompanying transcript of a medical certificate of death, the original of which was made out by you, and note thereon whether the diagnosis was based on *Clinical Findings* or *Autopsy*; also whether there was *Surgical Intervention*? In either case the *Seat of the Disease* should also be stated. Any further data which you care to give may be written on the reverse side of the transcript.

The information will be treated as strictly confidential and used for statistical purposes only. I feel assured that your interest in advancing the scientific study of this subject will prompt you to aid the Bureau in this great work, the success of which is entirely dependent upon the coöperation of American physicians.

Prompt return of the information desired, by means of inclosed penalty envelope, which requires no postage, will be greatly appreciated, as we are now compiling these returns.

Very respectfully,

SAM. L. ROGERS,

Director.

About 37,000 of these circular letters were sent to the attending physicians and it is gratifying to be able to state that replies were received to more than 60 per cent. of them. In this connection we should not lose sight of the fact that in many cases the deaths occurred nine or ten months prior to the date of the receipt of the letters.

In behalf of the Bureau of the Census I wish to express here its appreciation of the interest and courtesy shown by thousands of American physicians in their replies. It was necessary in many cases to look up records which were months old; in others certificates had been signed by doctors who had answered calls in the absence of the regular medical attendants, but who either referred the Bureau to the latter or obtained from them the case histories. Many replies were accompanied by extracts from hospital records, nurses' charts, and even photographs of the growths. Deserving of very special thanks are two cases in which widows of deceased physicians sent extracts from case histories as found in the records of the physicians.

I agree fully with Mr. Lakeman's statement that if it were possible for the states to make such inquiries shortly after the deaths occurred a very much larger number of replies would be received.

It may be well to call attention here to the probability that one result of the Census inquiry will be the showing of an apparent increase in deaths from visible or accessible malignant growths. In editing the replies of physicians quite a number of cases have been noted of which the following is an example: The return is "cancer of the liver." The physician replying to the Census inquiry as to means of diagnosis states that, so far as the liver was concerned, the diagnosis was purely clinical but prior to this a cancer of the breast had been excised; or that the decedent had suffered for years with a malignant tumor of the rectum, the uterus, the axilla, the face, or of some other visible or accessible organ or member. Now, in classifying such a case the Bureau was confronted with this situation: (a) the existence of cancer was certain or "reasonably certain" in the visible or "accessible" organ or member; (b) the existence of cancer in the inaccessible organ was confirmed by clinical symptoms only; (c) the Executive

Council of the American Society for the Control of Cancer in conjunction with representatives of other interested organizations and persons made the following recommendation to the Bureau of the Census: "That all diagnoses of inaccessible cancer based on clinical findings alone should be referred to the 'uncertain' class regardless of any strength of assertion by the physician that the diagnosis was correct."

Under these conditions it was decided to classify the death as one caused by cancer of the visible or accessible organ, it being deemed better to establish as nearly as possible the number of deaths in which it was "reasonably certain" that the cause was cancer, than to tabulate under the head of cancer of *any given organ* deaths which were declared by the Society to be *uncertain as to cause* owing to the fact that the diagnosis was based on clinical findings only. In former years, however, such a death, classified on the basis of the original unamended statement, would have been charged to cancer of the inaccessible organ, and it may be that the number of changes will be sufficient to influence the rate for title 44 (Cancer of the skin) and title 43 (Cancer of the breast).



\$100,000 TO BE SPENT ON NEW YORK OR MASSACHUSETTS TOWN TO CONTROL TUBERCULOSIS.

Intense rivalry is being exhibited between towns in Massachusetts and New York in their endeavor to secure a fund of \$100,000 which is to be expended during the next three years in an effort to control the spread of tuberculosis by the National Association for the Study and Prevention of Tuberculosis, as announced in a bulletin issued by that organization recently.

More than fifty different towns and villages, ranging in population from four to ten thousand inhabitants each, have been suggested as possible places for the experiment, and the State Charities Aid Association of New York, the Massachusetts Department of Health, and the local organizations in many of the towns are urging their claims with vigor. Among the towns which are being considered carefully are Canandaigua, Johnstown, Patchogue in New York; Framingham, Winchendon and Norwood in Massachusetts. The conditions of the experiment limit it to a town not to exceed five to ten thousand inhabitants.

The preliminary committee appointed to select the place consists of Dr. Edward R. Baldwin of Saranac Lake, President of the National Association for the Study and Prevention of Tuberculosis, as chairman; Dr. Lee K. Frankel and Mr. Homer Folks of New York, Dr. Arthur K. Stone of Boston, Dr. Stephen J. Maher of New

Haven, Dr. William Charles White of Pittsburgh and Dr. Charles J. Hatfield, New York, executive secretary of the National Association for the Study and Prevention of Tuberculosis, as secretary. The committee has chosen Dr. Donald B. Armstrong of New York as executive officer of the experiment.

It is proposed by the committee as soon as the place is selected to discover with the aid of the local physicians, through careful medical examinations, every case of tuberculosis; every individual who has been exposed directly to the disease; and particularly all children up to sixteen who have had contact with a living case of tuberculosis during their lifetime. It is proposed that every known case of tuberculosis and every exposed case of whatever nature should be under some sort of supervision during the three-year period, either in the home, in an open air school, in a tuberculosis clinic, or in a hospital or sanatorium. In this way and by keeping in close contact with all new families and new babies born into the community the committee hopes to be able to prevent the spread of tuberculosis, to stop the development of any new cases in the community, and to determine the absolute and relative worth of the various methods usually employed in fighting tuberculosis.

ORGANIZING A STATE CAMPAIGN OF PUBLIC HEALTH EDUCATION.

C.-E. A. WINSLOW,

Professor of Public Health, Yale Medical School; Formerly Director, Division of Publicity and Education, New York State Department of Health, and Curator of Public Health, American Museum of Natural History, New York.

Read before a General Session of the American Public Health Association, Rochester, N. Y., September 8, 1915.

Read over this list of sub-titles indicating some of the features of public health education which are discussed by Professor Winslow in this article: "The Monthly Bulletin," Special Bulletin and Circulars," "The Newspapers as a Medium for Public Health Education," "Lecture Service," "Exhibits," and "Mobilizing the Community for Public Health."

IT IS unnecessary to argue before the American Public Health Association as to the importance of public health education as a factor in the prevention of preventable disease. The placing of this symposium upon the program shows what our officers think of the subject, and the size of the audience which has gathered to discuss it indicates that the members and guests of the Association are of the same mind as to its significance.

It was in the campaign against tuberculosis that the importance of reaching the individual citizen and teaching him about the conduct of his individual life was first definitely grasped. In the case of this disease it was quite clear that the most important of all measures were those which built up the vital resistance of the body and maintained the fighting edge which is so effective against this particular microbic enemy. Sanitary shops and tenements were needed; the sanitary care of sputum was needed; but, above all, healthy habits of individual living were essential. Hence the anti-tuberculosis movement became a great campaign of popular education. It was animated by a new idea, the idea of bringing hygienic knowledge right to the individual in his home or in his shop; and it developed a new machinery, a new system of organization for bringing about this end. The general anti-tuberculosis movement began in the United States in 1904, and since January, 1905, anti-tuberculosis organizations have in-

creased from 24 to 1,228, sanatoria, hospitals and day camps from 115 to 527, dispensaries from 19 to 395. In doing this work the medical and sanitary experts, and particularly the social workers, not only pointed the way to a conquest of the great white plague, but set in motion forces which are revolutionizing the campaign for public health in every field. The same thing has happened more recently in the movement for the reduction of infant mortality. Budin began his conferences with nursing mothers, in 1894, but for ten years more public health officials were chiefly concerned with attempts to improve an artificial milk supply, while the central features of the problem, the child and the mother, were ignored. When the first American Conference for the Prevention of Infant Mortality was held at New Haven, in 1909, it was surprising to see how experience from every organization dealing with the problem had focused on a single point. Man after man said in effect that he had come to feel that the success of his station could be gauged, not by the quarts of milk distributed, but by the number of nursing mothers under instruction. The movement for the reduction of infant mortality became at that meeting, consciously and definitely, an educational one, and its prime task is today recognized, as clearly as in the case of tuberculosis, to be the task of carrying sanitary and hygienic knowledge into the individual home.

Education is indeed the keynote of the modern campaign for public health. Tuberculosis and infant mortality are preëminent among all the causes of preventable disease and death as the greatest scourges, from the abatement of which the largest results for humanity are to be attained. In each case the fight must be won, not merely by the construction of public work but by altering the daily conduct of the individual life. The same thing is true with regard to the spread of the acute contagia, the burden of venereal disease, the obscure ill effects of defective eyes and ears and teeth. In the campaign against the degenerative diseases of adult life, which progressive state and city health departments are now initiating, the education of the individual is our chief weapon. In every one of these cases the fight can be won only by spreading clear and definite knowledge of the ways in which disease is caused and the ways in which it may be prevented.

The general recognition of these facts is very recent and the technique of the art of public health education must be elaborated and perfected during the next few years. It has therefore seemed to me that in opening this discussion it might be of interest to review very briefly the attempts that have been made by the reorganized New York State Department of Health to work out the problems of public health education, in the hope that the lessons we have learned may be of value to those who are meeting the same difficulties in other communities.

HEALTH EDUCATION IN NEW YORK BEFORE 1914.

While the formal recognition of public education as a definite health department function is of recent date, we shall lose our perspective if we minimize the admirable pioneer efforts along health educational lines which have been made by some of the more enlightened health departments for many years. In New York State, for example, Commissioner Eugene H. Porter organized a Bureau of Instruction and Publication in 1905. Dr. Hills Cole became Director of a Division of Publicity and Education in 1906 with special charge of the editing of the monthly bulletin and the arrangement of the annual sanitary conference and sanitary institutes. Dr. H. D. Pease, then Director of the Laboratory of the Department, prepared

an admirable traveling tuberculosis exhibit in 1907, and in conjunction with the State Charities Aid Association organized a fruitful exhibit and lecture campaign throughout the state in connection with this disease. Deputy Commissioner W. A. Howe in subsequent years organized an extensive lecture service with a large staff of special lecturers, serving the department when called upon, on a per diem basis. In 1910 a special exhibit dealing with sanitary engineering was prepared to be shown at the State Fair; and since the International Congress of Hygiene and Demography, the general exhibit work of the Department has been steadily developed by Mr. C. J. Storey, as Supervisor of Exhibits.

A foundation had thus been laid for all of the three fundamental phases of public health education, literature, lectures and exhibits, as early as 1907; and the work on the health exhibits was carried forward steadily and progressively, so as to become a real and important influence for good throughout the state. With the reorganization of the New York State Department of Health in January, 1914; with the creation by law of a Division of Publicity and Education as one of the nine fundamental divisions of the Department; with a larger appropriation than had before been available for the purpose; and with the energy, the enthusiasm, the courage and the wisdom of Commissioner Biggs to inspire and to guide; it became possible to develop plans for public health education upon a broader and more systematic scale.

THE MONTHLY BULLETIN.

The monthly bulletin of the Health Department is its official organ of communication with the public; and our first effort has been to convert it into an effective medium of health education for the more intelligent and interested classes of the community.

There is a popular writer for the *Saturday Evening Post* who has created for himself an ideal middle-western family from whose standpoint he criticizes everything he writes. The father is a clerk in a small store. The mother does her own housework. The elder sister is a teacher, the younger is in high school and the son drives a delivery wagon. Nothing goes into this author's "copy" unless he can see its

appeal to this family. Somewhat in the same way, I think, it is important for us to visualize, in everything we write, the public for which it is intended, and to study with much care the best possible way of getting a particular truth "over" to a particular audience.

The *Health News* is intended to reach the local health officers and physicians in small towns, the social workers, the school teachers and other educated citizens who are or may be interested in health problems. On the one hand, therefore, we do not use it for merely elementary exhortations as to the wellknown laws of health, but attempt so far as possible to present the latest information in regard to the progress of sanitary science and the local health problems of the state. On the other hand, long and technical discussions, of interest only to the highly trained expert, are banished from its columns and issued when necessary as special bulletins to a selected mailing list.

The name of the *Monthly Bulletin* we changed to *Health News*, and its somewhat cumbersome form to a convenient 6" x 9" size printed in large clear type. In each number some one subject is specially emphasized, such as Water Supply and Typhoid Fever, Smallpox and Vaccination, School Hygiene, Infant Welfare, Hot Weather Hygiene, Vacation Typhoid, Oral Hygiene, Cancer, Diseases of Adult Life, Farm Sanitation, Teeth, Tonsils and Adenoids, and the like. Each issue begins with a double-leaded editorial followed by two or three brief articles (500-1,000 words) by authorities upon the subject under discussion. The Department has been most fortunate in securing the generous coöperation of such men and women as President Eliot, Dr. T. M. Prudden, Dr. Simon Flexner, Prof. L. H. Bailey, Prof. G. N. Calkins, Dr. W. A. Evans, Dr. L. K. Frankel, Dr. W. H. Park, Dr. S. Josephine Baker, Dr. L. Emmett Holt, Dr. Theobald Smith, Prof. H. N. Ogden and Prof. W. T. Sedgwick in the preparation of these articles.

Significant departures in administrative procedure, national, state or local, and important epidemics are described as object lessons in the *News* and special attention is paid to news items in regard to current sanitary progress in the state. Each issue is illustrated with cartoons, diagrams or photographs, one of which is always displayed on the back cover.

Reports of divisions are reduced to very moderate dimensions, not only to save space but to make them more readable. Half a page that is read is much more valuable than five pages merely turned over, and I would commend to those who are specially interested Doctor Wadsworth's reports of the Division of Laboratories on the last page but one of each issue of the *Health News* as models of compact and effective presentation.

Tabulations of vital statistics are also reduced to a minimum. The monthly reports of many health departments waste a regrettable amount of good paper and ink in the presentation of tables full of blank spaces, or of figures too small to be of the least practical significance. On the other hand, I believe that a compact review of the general tendencies of the vital statistics for each month, in comparison with previous months and previous years, is one of the most important features, which we find is freely quoted in the public press. It is perhaps unnecessary to remark that abstracts of this and other matter of general interest should be given to the newspapers at the time of publication of each issue.

Following the lead of Virginia and other states we make the January number of the *News* a Health Almanac and this Almanac has perhaps received more favorable comment than any other feature of the work of the Division.

Eleven issues of the *Health News* were issued during 1914 with a total of 436 pages. The edition was increased to 35,000 copies and the *News* was mailed (except during the summer months) to each of the 15,000 school principals in the state as well as to the 1,200 health officers, the 8,000 physicians and a large special mailing list of persons interested. We feel that the public school is a vital strategic point in the health campaign and have striven to make the *News* of special value to teachers in their work. Each issue published during the school year has contained a special Health Lesson, a basis for a classroom talk to children on some important health topic, and we have received gratifying response from the teachers in regard to this plan. Owing to lack of funds it has been necessary during the present year to omit the school principals from our mailing list, except for the Almanac and a special Arbor Day number, but we hope this fall to reach the schools either through the Bulletin of the Department of

Education or by means of brief Health Lessons and special circulars prepared for that particular purpose.

SPECIAL BULLETINS AND CIRCULARS.

In addition to the distribution of the *Health News*, it is of course the duty of the Department to issue special bulletins and circulars of information in regard to particular health problems. During the year 1914, five special bulletins and twenty-four circulars were issued by the Department.

The special bulletins deal with Infant Welfare Campaigns and Infant Welfare Stations, with the campaign for County Tuberculosis Hospitals, with Regulations for Cleansing and Disinfection During and After Attacks of Communicable Disease, and with the general aims and progress of the health movement in the state.

Ten of the twenty-four circulars relate to particular diseases, diphtheria, measles, scarlet fever, septic sore throat, smallpox and vaccination, sore eyes of new-born babies, tuberculosis, typhoid fever and whooping cough. Each circular contains specific directions for the patient, for the physician, and for the health officer, according to an excellent plan worked out by Dr. F. M. Meader, Director of the Division of Communicable Diseases.

Eight of the circulars deal with infant welfare, seven of them being brief, one-to-four-page leaflets on special problems of infant hygiene and the eighth a 28-page booklet on *Your Baby—How to Keep It Well*, prepared by Dr. H. L. K. Shaw, Director of the Division of Child Hygiene, which is sent automatically to the mother of every child in the state as soon as its birth is registered at Albany and is, we believe, accomplishing an incalculable amount of good. Efficient birth reporting, such as we are now securing in New York State, is of course essential for the success of this plan. The Infant Welfare leaflets have been translated into Italian and Polish. We should like to have these circulars and many of our other more elementary publications in Yiddish as well, so soon as funds permit.

The other six of our circulars deal with Farm Sanitation, with *The Filthy Fly*, *The Teacher and Communicable Disease*, *The Conduct of an Isolation Period in the Home*, *Amusements for Convalescent Children* and *Industrial Tubercu-*

culosis (a folder intended for distribution through the medium of labor organizations).

THE NEWSPAPER AS A MEDIUM FOR PUBLIC HEALTH EDUCATION.

In order to come in touch with a wider public than could possibly be reached by our official publications, we have asked the newspapers of the state to coöperate with us and have met with a ready and generous response. The public is more than eager for news of the campaign against preventable disease and the editor is ready and anxious to disseminate it—provided only that it be furnished in usable and effective form.

I am personally of the opinion that the director of a division of public health education in a large city or state should, where possible, be technically trained in public health science so that he may speak with individual authority to the medical profession as well as to the public. Such a director should, however, have at his right hand an expert in the art of publicity, preferably a man or woman with actual newspaper experience, for journalism has its technique just as sanitation has. In New York State we have been fortunate in securing for this important work the services of Mr. E. A. Moree of the State Charities Aid Association as Advisory Expert in Public Health Education; and Mr. Moree has had entire charge of all the special material prepared for the newspapers from time to time in regard to changes in department policy and to particular problems which we wished to bring forcibly before the public.

Our chief enterprise along the line of newspaper publicity has, however, been our weekly plate service which we call *Health Hints*. These Hints are about five hundred words in length and are sent out in plate or electrotypes form to a special list of a little over three hundred daily and weekly papers throughout the state, and in proof form to the rest. The plates which are handled by the American Press Association are sent out every six weeks, a single plate containing six of the hints with release dates indicated on the proof and the total cost is \$1.50 per plate or 25 cents a week for each newspaper.

The sort of topics covered are indicated by

the list of headlines for a year's Hints below, from June, 1914 to June, 1915:

Hot Weather Hygiene
 Anti-typhoid Vaccination
 Reporting Communicable Diseases
 Isolation and Quarantine
 Health on the Farm
 Milk Supply and Disease
 Safe Meat at Lower Cost
 Modern Disinfection, Simple and Efficient
 Time Limits for Infection
 The Story of a Typhoid Carrier
 Smallpox and Vaccination
 Communicable Diseases of School Children
 Black Death at New Orleans
 The Health of Armies
 Tuberculosis, The Universal Foe
 County Hospitals and Taxes
 Health Work Saves 700 Infant Lives
 State Sanitary Rules for Dairy Farms
 Food Values and Costs
 Need for a Varied Diet
 Victims of a Typhoid Well
 Early Signs of Tuberculosis
 Why Bad Air is Bad
 Dust and Disease
 Health Questions Answered
 Typhoid Fever at a Church Dinner
 Cancer—A Curable Disease
 New Ways of Making Water Safe
 People who Never Catch Cold
 Diphtheria Conquered by Antitoxin
 Getting Ahead of Measles
 Little Mothers' Leagues
 New State Law on Nuisances
 4,000 People Saved
 Season and Vitality
 How to Prevent Pneumonia
 Checking School Epidemics
 Control of Whooping Cough
 The Deadly Drinking Cup
 Spring Clean-ups and Flies
 Typhus Fever and its Cause
 Arbor Day and Health
 What Milk do You Drink?
 Diseases of Adult Life
 Alcohol the Common Foe
 Flies or Babies?
 Summer Care of Babies
 Patriotism and Lockjaw
 Starving Out the Enemy
 The Messenger of Health

Keep Cool

Avoid Vacation Typhoid
 Getting Rid of Mosquitoes
 When the Baby is Sick
 More Milk-borne Disease
 State Laboratory Works for You

We confine ourselves quite closely to public health problems; for in a public service of this kind it would hardly be proper to deal with such purely medical questions as are treated, for example, by Dr. W. A. Evans in his admirable column on How to Keep Well in the *Chicago Tribune* and syndicated papers. As a rule two of the Hints out of each batch of six are illustrated. Each Hint runs across two columns with a uniform head bearing the state seal at the top above the headline and occupying about nine inches or 18 column-inches in length. The style is made extremely simple and popular, important words being printed in bold type; and I have constantly tried to keep in mind the advice of a wise and expert journalistic friend to "tell the gist of the story in the first paragraph; make the information specific; avoid a heavy dictatorial style; quote individuals and mention names whenever you can; avoid technical terms and subtle distinctions so far as possible."

If I may be permitted a personal confession, an unduly solemn and arbitrary manner in preparing popular health material is one of the most difficult things to avoid for a man of New England birth and training. I think I perceive signs of the same failing in much of our Eastern health literature. The Middle West, escaping from the Scylla of the pulpit, sometimes falls a victim to the Charybdis of the vaudeville stage; while much of the Southern literature, notably that of North Carolina and Virginia, strikes a very happy mean of cheerful and chatty, but not undignified instruction.

The newspapers to which our Hints are sent in plate form use them with a high degree of regularity, and we estimate that by this means we are reaching over a million readers a week. Individual responses are most-gratifying. One country editor remarked in conversation that when he left out the Health Hint one week, three subscribers wrote and asked the reason, "which never happened before in my whole editorial experience."

Another editor writes:

"We wish to thank you for the much prized pleasure of noting the *Journal* in the preferred list for the health plate service which has rewarded your efforts so ably presented at the recent legislative session.

"We believe the good such publicity brings for the cause is far reaching, and is of such a nature that only time alone can show the result.

"We have been pleased to devote the space to such work and the plate service simplifies the work for the busy editor to the extent that the Department is insured of more productive results for their efforts for the public good.

"Again thanking you for past courtesies, and wishing you to know that the *Journal* is ever at your service."

A shoemaker in an upstate town told an official of the State Department of Education, "my little girl reads those Health Hints aloud to the whole family every week as religiously as her mother does the Bible."

I am personally of the opinion that the maintenance of a weekly plate health service is the most important thing a health department can do along educational lines, next to the issue of its monthly bulletin. In our own case I am sure that it has not only accomplished a real work of public health education but has contributed in large measure to the splendid support given to the Health Department by the newspapers of the state, at a time when legislative attacks seemed to endanger the successful continuance of our work.

ORGANIZING A LECTURE SERVICE.

The old plan of lecture service under which the New York State Department worked was based on the occasional employment of special lecturers of whom a considerable number were attached to the Department to be called on when needed and paid so much a lecture when actually employed. There are several serious objections to such an arrangement. In the first place per diem employment of this sort is expensive. In the second place it is difficult to supervise a large number of part-time lecturers; and finally a plan of this sort offers rather special temptations to political influences.

With the reorganization of the State Department of Health and the creation of a corps of

twenty district sanitary supervisors, it was possible to meet the needs for a public health lecture service in a more efficient manner. Lectures on general health topics are now assigned as a matter of routine to the sanitary supervisor of the district concerned, and the twenty supervisors deliver on the average about fifty lectures a month.

During the past winter we had also four special lecturers attached to the Division of Publicity and Education. Two of them, lecturers on oral hygiene and on diseases of the eye and ear, respectively, devoted themselves almost entirely to work in the public schools, while a third was appointed as a special lecturer to parochial schools, and the fourth was a woman physician who lectured on infant welfare and social hygiene. These four lecturers gave fifty to seventy-five lectures a month last winter. None of these special lecturers, except the one serving in the parochial schools, have been provided for by the legislature in its appropriations for 1915-1916. I am inclined to think that the lecture work in the schools might more properly be conducted by the Department of Education, rather than by the Department of Health; but a special lecturer on infant welfare and social hygiene can render very valuable service in talks to women's clubs and similar organizations.

Much of the lecture work called for in a large state like New York must necessarily be done by local health officers, physicians and other persons interested in the general cause. For the benefit of such persons, occasionally called upon to speak upon health topics, as well as for our own sanitary supervisors, we have prepared printed lecture syllabi of eight to twelve pages each on the War Against Tuberculosis, Health on the Farm, Clean Milk and Safe Milk, Man and the Microbe, and Famous Epidemics. For each of the first four of these lectures we have a set of from thirty to fifty lantern slides, which are loaned on request to health officers or others who may need them.

As a further aid in popularizing our health lectures we have prepared three motion picture films—Bringing It Home, the story of how circumstances, plus the state infant welfare exhibit at a county fair, brought home to a doubting capitalist the value of an infant welfare station; In His Father's Footsteps, in which

stern experience teaches a conservative farmer that the old ways do not pay; and a Messenger of Health, the story of a visiting nurse. The demand for these films by health officers and others shows that motion pictures can be of great service in a public health campaign. We have used them at a great many public meetings where our exhibit has been held. In some places the use of the motion picture houses was secured especially for this feature. In others, the films have been shown as part of the regular program in the theaters, and the fact that they were on exhibition advertised as a special feature.

We feel that the reels which we now have are perhaps only a nucleus for a library of educational films which could include popular films as well as technical ones which the agencies never handle.

It is not of course sufficient merely to be ready to arrange for giving lectures when they are called for. Here, as well as everywhere else, there is what corresponds to the manufacturing work of our business and what corresponds to the selling end.

In order to enlarge the demand for health lectures we have organized systematic campaigns among the women's clubs, the granges and the labor unions, and the same thing might be done with chambers of commerce, rotary clubs and other organizations. The plan in each case is essentially the same. First of all, an endorsement is obtained from the state body which represents all the various local clubs. Then a letter is sent out to each local organization with the endorsement of, or in the name of, the state federation, offering the service of the Health Department lecturers. When the lecture is actually given the attempt is usually made to have a Public Health Committee appointed by the organization, since such committees, while not spontaneously active, furnish machinery useful in future health campaigns.

PUBLIC HEALTH EXHIBITS.

The distribution of literature and the organization of a lecture system must be supplemented by a more striking and vivid appeal to the eye; and the exhibit now forms a part of any well-developed public health campaign.

The New York State Department of Health, as pointed out above, has for nearly ten years

been a pioneer in this field; and a skilled and experienced Supervisor of Exhibits, Mr. Charles J. Storey, was appointed by the Department under the previous administration.

During the past eighteen months we have prepared three new travelling exhibits dealing respectively with Child Welfare, Rural Hygiene and the Hygiene of Adult Life. Each of these exhibits is made up of about eighteen large panels (six feet by three feet) illustrated by hand-colored photographs, pictures and diagrams and mounted by an ingenious system of supports devised by Mr. Storey, which are solid and yet may be easily taken apart for transportation.

The Child Welfare Exhibit, of which we have three duplicate sets, includes eighteen panels illustrating the importance of birth registration, disinfection of the eyes of new-born babies, breast-feeding, fresh air, cleanliness, fly protection and vaccination, showing how milk should be pasteurized and cared for, and how the baby should be washed and fed, and emphasizing the value of the infant welfare station as a center for the education of the mother. A special feature of the exhibit, which has proved of the greatest value, is a fully equipped infant welfare station in charge of a trained nurse as demonstrator.

The seventeen panels in the Rural Hygiene Exhibit, of which we have also three sets, illustrate the sanitation of the home and the importance of cool fresh air; the proper way to dispose of household wastes and the control of insect carriers of disease; the methods by which safe water and milk can be ensured, and the precautions which should be taken to check the spread of tuberculosis and other communicable diseases on the farm. The panels in this exhibit are supplemented by models of a group of sanitary farm buildings, and of a dangerous and a well-protected well.

The nineteen panels in the Adult Hygiene Exhibit deal with the increasing death-rate at ages over 45 and its contributing causes, with the evils of alcoholism and venereal diseases, and with the fundamental hygiene of the diet, of fresh air, exercise and rest, with the control of cancer and the importance of systematic medical examination for the detection of degenerative diseases in time to check their development.

During the spring and early summer of 1914,

the Child Welfare Exhibits were shown in 59 different communities throughout the state, while in August and September both Child Welfare and Rural Hygiene Exhibits were sent on circuit to the county fairs, being shown at fifty-three county fairs, as well as at the State Fair at Syracuse.

The general plan of arranging for an exhibit is as follows: First of all, preliminary arrangements as to date, exhibition hall and lecture room are made by correspondence with the local health officer and other persons especially interested, and as soon as this has been done a letter is sent out from Albany to the local physicians and clergymen asking for their coöperation. About two weeks ahead of the date set for the opening of the exhibit, an advance publicity man visits the town, armed with illustrated material for the local press. He makes sure that the arrangements for the hall are satisfactory and plans with the school authorities for the children to visit the exhibit and to attend the meetings for the organization of Little Mothers' Leagues. The exhibit is actually installed by one of the Department nurses with the assistance of a laborer, and the nurse remains in constant charge while it is open and conducts the meetings for the school children, while evening meetings for the public are addressed by the local health officer, the sanitary supervisor of the district, and speakers from the Health Department staff at Albany.

This type of intensive exhibit campaign has its own distinct and individual advantages. It is particularly well suited for rousing public opinion as to some particular local sanitary need; and our Child Welfare Exhibit has been followed throughout the state by a trail of enthusiastic and constructive infant welfare work. It has seemed to us, however, that such a program of exhibit work might well be supplemented by some plan for reaching a larger number of communities in a given time and at a less cost. This implies the reproduction of Exhibit panels by some mechanical process in a form convenient for shipment and display, and after much thought and some experimenting we have hit upon a practical plan for doing this.

The National Process of New York has prepared for us during the past summer 50 sets of reproductions of our Adult Hygiene panels, printed on 12-ply card, 28 inches by 22 inches,

which seem to meet all the essential needs of the situation. These cards, with the illustrations hand-colored, can be obtained after the first plates are made for fifty cents apiece and perhaps later on even for less, and we trust that they may be of service to health workers outside New York State as well as in our Department. Our plan is to send these panels to various communities in the state and have them displayed by the health officer or by any organization interested, in the library or high school or some other prominent location where they can remain for several weeks.

There is one further step which it seems to me should be taken to make our exhibit work more effective. In connection with all our exhibits, literature upon health topics is of course supplied for general distribution. I should like, however, to have cuts of the exhibit panels themselves prepared and printed with an explanatory text in the form of a special circular, so that the visitor whose interest has been roused by the sight of the large panels might carry home with him the same lessons to be studied and assimilated at his leisure. Plans are already under way for the preparation of such a circular on the Hygiene of Adult Life, to be used in connection with the exhibit devoted to that special subject.

MOBILIZING THE COMMUNITY FOR PUBLIC HEALTH.

There are two distinct reasons why the enlistment and organization of a wide public is vital to the success of our health campaign. In the first place the individual citizen must be taught the principles of hygiene and sanitation for his own use and application. The reserves are always at the front in the campaign against disease, and the battles are in the nature of a guerilla warfare in which each one must be taught to do his part. The National Health Guard of the Life Extension Institute is an admirable example of organization for such purposes as these.

It is not alone for education in the laws of individual hygiene and sanitation, however, that the public should be enlisted in the health campaign. If we really want to prevent preventable disease, we must supply the machinery, the fortifications and munitions of war, to use against the enemy. We must install effective

water purification plants and adequate systems of sewerage and sewage disposal. We must provide infant welfare stations in the proportion of one for every 20,000 of the population if the death-rate of infants is to be effectively reduced. We must have adequate systems of medical inspection and school nurses, not one for each 2,500 school children but one for every 1,000, if our young soldiers of peace are to come to maturity in full vigor and free from physical defects. We must build contagious disease hospitals with a capacity of one bed for every 2,000 of the population. We must provide tuberculosis hospitals with a capacity of one bed for every 1,000 of the population, for the cure of

early and the isolation of advanced cases of this disease, and corps of visiting nurses to find incipient cases and secure proper care for patients in the home. All these things cost money, and in order to secure them we must have in each community an aroused and organized public opinion. We can form such an opinion if we will educate and continue to educate. The same diffusion of knowledge which equips the citizen to cope with the problems of personal hygiene will ensure his coöperation in community efforts against preventable disease, will convince him that public health is indeed purchasable, and that in very fact a community, within natural limitations, can determine its own death-rate.



IS GASTRIC ULCER PRIMARILY DUE TO AN INFECTIOUS ORGANISM?

At a recent meeting of the Medical Society of the County of New York a very interesting discussion took place as to the etiology of gastric ulcer. The work of Doctor Rosenow, showing that an infectious organism was probably responsible for the development of ulcers in the stomach and small intestine, was dwelt on with particular emphasis. Through all this discussion one possible causative factor was completely lost sight of, viz., the influence of sedentary occupation, and of nervous strains associated with various vocations, in producing digestive disturbances, which might well lay the ground-work for future ulcerative conditions, whether these be caused by infectious organisms or otherwise.

The clinicians who inquire carefully into the habits and occupations of their patients, especially those suffering from digestive disorders, must have been struck by the frequency with which such cases give a history of nervous strain associated with their work, of sedentary employment, and of brief lunch periods that compel bolting of food and allow no time for mental and physical rest before returning to work. Especially illustrative may be the cases among poor students who often suffer from a combination of these occupational factors, as well as from cheap and improperly prepared food; among these frequent complaint may be heard of pyrosis and epigastric distress, which continue in many cases unabated throughout student days. With the freedom from the nervous strain and sedentary employment incident to studies that follow upon their entrance into professional life, there comes often a most decided improvement

in health with respect to gastric complaints, until such time when professional duties begin to multiply and nerve strain once again becomes a dominant factor.

The number of shop girls, clerical workers and others who are subject to occupational influences which predispose to disturbances of the digestive organs would probably be found to be very great if careful occupational histories were as much in vogue as they are at the Massachusetts General Hospital, and at the University of Pennsylvania Medical College and Hospital, which is now taking up occupational diseases in an intensive way.

The lowered state of resistance, local and general, which these digestive complaints may induce, would, it seems, favor the action of infectious organisms, if indeed, in the ultimate analysis, the latter are definitely proved to be the cause of gastric and duodenal ulcers. Admitting that this observation is applicable in only few cases, it is, however, important enough to deserve careful study by internists, who, by timely advice, might prevent the development of ulcers and overcome the occupational influences that predispose to this condition. In many cases, violent as the economic readjustment might well have to be, it would seem more in accord with the spirit of the modern preventive medicine to counsel a change of employment; radical as the effects of such advice might be, it is vastly more conservative than allowing a patient to drift into invalidism, with severe surgical treatment, or even malignant degeneration of an ulcer as the ultimate goal.—*Bulletin of the New York City Department of Health.*

THE SUPPRESSION OF THE DRUG VICE CONSIDERED FROM THE DEMAND SIDE.

J. FRANK CHASE,

Secretary of the New England Watch and Ward Society, Boston, Mass.

Read before a General Session of the American Public Health Association, Rochester, N. Y., September 9, 1915.

In this paper the author attacks this vice from a new angle. Continue the restriction of the supply, but also cure the users.

IN HIS book entitled "Prostitution in Europe," published under the Bureau of Social Hygiene, New York, Abraham Flexner, the able investigator employed by Mr. John D. Rockefeller, has among other things set forth an economic principle in such a way as makes the book a valuable contribution to the literature on the "social evil." He has applied the economic law of supply and demand to that vice in such a way as to throw great light upon it. He distinguishes between the supply factors and the demand factors in that vice, and points out the influence of each upon the other and how each must be controlled. The use of this law in that field enables us to grasp the conditions of the solution of the problem more firmly than ever before. It gives us power to think the problem through, it makes the problem more manageable to the human mind; it is a very fruitful idea giving birth to many new thoughts on the subject.

We see by it, for example, how one-sided many efforts in the past to solve the problem of the social evil have been. Attempts have been made to manage it by dealing almost wholly with the female or supply factor by a process of law enforcement while

neglecting the demand factor or the male end of the vice by such forces as special education in social hygiene, social condemnation, punishment, purified environment, moral and religious instruction, and last but not least opportunity for innocent recreation. The demand for illicit intercourse, Flexner shows, is not alone the result of a constant pressure of natural impulse but can be stimulated and in commercialized vice is systematically and highly stimulated by such forces, for instance, as obscene books and pictures and intoxicating liquors, and conditions under which their sale is surrounded. The demand, on the other hand, can be affected and diminished by education and by other methods of preventing the artificial stimulation of the demand. Past efforts devoted only to suppressing the supply and paying no attention to the demand have simply made motion without progress. Too often we have only changed the form of the supply and have not really suppressed it. Law enforcement to suppress the supply and education and other distinctly preventive processes to suppress the demand is the sum of human wisdom in the suppression of this vice at present. These two methods of law en-

forcement and education must go hand in hand. Failure to recognize and deal with both factors—supply and demand—has been one of the mistakes of the past.

Are we not falling into the same error in dealing with the habit-forming drug vice? In this vice there are also two factors, the supply factors and the demand factors. Have we not been paying too much attention in its solution to the supply factors? The Harrison Bill attempts almost wholly to regulate the supply for the United States. State laws are almost exclusively concerned with restricting the supply within the state. We have been trying to suppress the vice by restricting the supply.

The effect of restricting the supply, however, has been greatly to increase the price of these drugs. This prevents the acquiring of the habit by many and forces a large number to break it off, but the habit still has a large number so tenacious in its grasp that the enhanced price does not drive them from it. When the price reaches the figure it has in Boston it is a question how much farther the vice can be suppressed by restricting the supply factors.

Under such conditions, with the vice still existing, we are forced to cast about for something else to help us in our struggle, and help, we believe, will come mainly by considering the demand factor in this evil.

The demand factor, of course, is represented by a mass of human beings who have the intolerable craving for drugs. If we could relieve them of their craving by curing them, then the

illicit demand would cease. What then can be done to minimize the demand? Have we really seriously considered this side of the question in the past?

In his excellent pamphlet entitled "The Present Status of the Drug Addiction in the United States," Dr. Lyman Kebler of Washington, D. C., gives us the judgment of several hundred physicians throughout the United States as to the causes which have led to the contraction of the habit by drug victims.

These causes are in the main, four.

1. Careless prescribing by physicians.
2. Self-medication and patent medicines.
3. Bad company and dissipation.
4. Hereditary influences, neurotic temperament and degeneracy.

These four causes, then, promote this evil and if we aim to influence the demand for drugs we must find a means of removing the causes. I can do little more than to raise the question—how can these evils be remedied and how can the victims be rehabilitated.

I am going to point out five practical measures which aim to accomplish this end.

I. *We can diminish the demand for drugs by segregating and medically treating the drug victims who are also criminals.* It is always dangerous to give figures but I venture to state that 50 per cent. of the victims that come to our notice are men with criminal records. It may be that even 60 per cent. or 70 per cent. have criminal records. I cannot, of course, say just how many, but I know that a very

large per cent. have been found such in our experience. The habit itself naturally and fatally leads its devotees into a criminal career. Three years ago in one group of cases presented to the court by the New England Watch and Ward Society, the reform organization which I represent here, of 19 prosecuted for peddling drugs *all* confessed that they were drug users. We followed their subsequent history for two years and found that before the first year after their arrest had passed, one had been indicted for murder in the second degree and given twenty years in state's prison; one had been sentenced for highway robbery and given seven years in prison, and seven had committed crimes for which each one was punished within the year by not less than six months in the House of Correction. At the end of the second year, at another round-up of thirty-two drug peddlers by the officers of the same society, all but two of the original nineteen were in the House of Correction, and of these two, one had died of his drug habit and for the other we had a warrant.

While these perverts pass through our penal institutions and while wards of the state, is it not criminally negligent in the state not to treat them in such a manner as to cure them of their habit? I believe that in the majority of our penal institutions habit-forming drugs can be secured by the inmates more easily than when at large. Too often there, habits are fostered and increased, aye even contracted. The reason for this failure to control the situation more effectively is that we chiefly aim to keep drugs out of our

jails by shutting off the supply, a process fraught with great difficulty and almost impossible. We must stop the demand; we must segregate the drug victims and medically treat them. By this means the demand for illicit drugs will be lessened to a point where no supply will be forthcoming to meet it. A compound within the jail, specially guarded, and presided over by a medical expert with a dietary and general regimen such as a drug victim needs, would send out into the world men freed from a habit which if not cured, is sure to lead them to commit other crimes which in turn would soon bring them back. I am dealing here also with a great breeder of drug victims for it is in the jail where bad company is apt to be most fatally effective; here inmates must daily associate with others who are drug-users and consequently the newcomers acquire the habit. It is, therefore, of the utmost importance to take such steps as will tend to cure the criminal drug-user and at the same time prevent the contracting of the habit by others confined in penal institutions.

II. *Again we can reduce the demand by the creation of custodial institutions for non-criminal drug users.* Some states today have drug-curing institutions, admission to which is voluntary. These institutions were formerly for the cure of the liquor habit but have, through changed conditions, gradually become drug-curing institutions. The theory that no man can get cured of his drinking habits and then stay cured except by his own volition, has led to the error of thinking the same way about the treatment of the drug

habit. A cured drunkard must pass a hundred saloons every day out of which he can be kept only by the exercise of his will. The will, therefore, must be educated. But with the drug-user conditions are not the same. He can get drugs only under difficult conditions. If his system can once be eased of its craving he can easily be kept from obtaining a new supply of drugs because unless he wants them intensely he will not pay the price or undergo the difficulties necessary for their possession. Hence the liquor problem is somewhat different from the drug problem.

Institutions where drug victims can voluntarily commit themselves and can leave them when they wish to are of limited usefulness. And this is so for several reasons.

1. In what condition to form a resolution to get cured is a man when he is in the grip of the habit?

2. If he has that resolution, in what condition is he to decide intelligently whether he would better stay in an institution or not when the agony of abstinence is on him?

It would be a mercy to such a man to say, "You must go to an institution," and later, "You must stay," and to force him to stay to complete his cure until the craving has disappeared. In order to make such an institution adequate we must find some way of getting a custodial hold upon drug-users. To do this it is necessary to devise a more intelligent test for deciding when a man is in reality a drug victim. In Massachusetts a person can be committed to certain drug-curing institutions when he "is so ad-

dicted to the intemperate use of narcotics as to have lost the power of self-control." With the present law the result is that the man cannot be committed unless he can be surprised at a time when he is actually in a drug stupor.

This is a very difficult thing to do and such a test usually results, therefore, in the continuance of his habit until he has become totally abandoned. The fact that he can continue so long without being forced into a cure means that during his career he is likely to lead many other persons to take up the very habit that is crushing him. Contrary to expectation the drug habit is not a solitary vice but rather is a sociable one. In it the principle "misery loves company" finds one of its best illustrations.

Two reasons, therefore, favor the custodial institution; the opportunity to effect an early cure of the habit of the individual and the possibility to rid society of a man who is a menace to its mental and physical health. This process of committing victims to a custodial institution would clear our streets of a class of persons who are in their way as dangerous as those infected with contagious diseases. We believe that association with drug-users is at present the greatest single cause of the drug habit within the class that comes within our observation. There is a kind of social suggestion by which the habit is spread by the power of example from one to another; and thus one drug victim in a community will in a short time lead scores of others into the habit. This he does for practical reasons, since those

who are led into the habit form his clientele and he gets money for his own supply by furnishing them with drugs.

The power ought to be vested in the court to commit an habitual user to a custodial institution for a time and power given to certain custodial institutions to keep a man there even against his will until he is cured. In Massachusetts we have some splendid drug-curing institutions for those who seek admission and who persevere in grace, but there are none except the jail where a recalcitrant can be forced to persevere however great his objections. The jail cure is simply that of abstinence.

I believe that most drug victims have lucid moments when they would commit themselves or when they would not resist committal if provision were made. When in the throes of the cure these same individuals would become refractory and if allowed to do so would leave the institutions.

Besides being a social purifier by clearing the streets of sources of contagion, the custodial institution is merciful because it provides a cure without a criminal record. If there were such institutions, men who are now sent to jail and given a criminal record for having drugs illegally in their possession could be sent to the custodial institutions and cured. The very fact that a man cannot be kept against his will in a drug-curing institution means that all attempts to help a drug addict by some of the common methods fail.

When a new offender is before the court, a humane prosecutor frequently would like to recommend mercy to the

court and to ask for probation for the defendant. Without a custodial institution to which to send such a man, probation means little. The judge at times gives him probation provided he will undertake a drug cure. He agrees to do so but is not forced to go at once and at times we find him even a week later on the streets not yet having entered the institution. Only when it suits him does he go. If he does not like the place he may strike a nurse or become obstreperous with the result that he is sent away, or he may not strike anyone but decide to leave via the fence—he is not sent for to return; he is free. It is likely that if he returned to the jurisdiction of the probation court he might be surrendered, but even that is not certain and generally no penalty is visited upon him unless he comes before the court charged with some subsequent offence.

If a custodial institution existed he could be placed on probation provided he committed himself for treatment, and if he committed himself he ought to be compelled to stay for a sufficient period to effect a cure.

It should be noted that so far I have dealt mainly with the influence of bad company as a cause of drug victims. Now I am going to consider remedial measures for the other causes.

III. Thirdly, then, what can be done to remedy the next great cause of the contraction of the drug habit—to wit—careless prescribing on the part of physicians. I am not educated in medicine so that I must not venture to say more than a layman is permitted to say.

This problem could be attacked in

two ways: (1) by better law and its enforcement, (2) by education and coöperation on the part of medical societies.

The general type of law in the several states today reads: "It shall be illegal for a physician to prescribe habit-forming drugs to a person known to him to be an habitual drug-user except it be considered therapeutically necessary." But even the enforcement of such a simple restriction encounters the greatest difficulties, so that the prosecution of a physician is seldom attempted. Let me enumerate the difficulties in the hope that some genius in the future may be able to obviate them.

The law provides that it is criminal to prescribe for a person known to the physician to be addicted to drugs. For the physician to know it the man must actually be so addicted. Now if a man is in reality a drug victim the courts will not believe anything he says so that the physician can refute all he may say in court. How could the physician know him as a drug-user unless the drug-user actually tells the physician? If the drug-user tells the physician he is a drug-user the physician can believe he is lying to him and still give him what he asks for. But one cannot establish by a drug-user the fact that he told the physician he was one because the doctor and patient are alone in the office and there is no way of breaking the balance by means of a third witness, and a doctor who will feed a drug victim's habit will not scruple to perjure himself on the stand. But even suppose he is not desperate enough to

perjure himself he can still say that he believed the drug was therapeutically necessary; can say, moreover, that he prescribed with instructions to the patient to take constantly diminishing doses. The prosecution might meet the therapeutic defence by putting an expert on the stand to testify that the prescription was not an ethical one, but I have had experience in trying to find an expert who would go on the stand against a fellow doctor or a fellow druggist. Perhaps some professor in a medical school might do so, but not a practising physician. They feel it would hurt their practice.

If, in the law, the words used were, instead of the words "Known to be a drug-user," "Known to be a drug-user or claiming to be a drug-user," we could then send in a detective who could test the drug business of a physician and, if the detective were in reality not a drug-user, his word might count against the physician, except that he would have to weaken himself by having to confess that he used a pretext to the physician in order to gain evidence against him.

With some better law the bad doctors could gradually be weeded out. But I believe the second method is at present the most hopeful, viz., that of education—education of the ethics of physicians by a propaganda carried on in the medical societies of this country. This might be systematically promoted. Just what that medical education should be I cannot say. But one thing I feel sure ought to be done, each medical society should appoint a body of able men who might be known as the Law Enforcement Com-

mittee, whose duty it should be to stand ready to appear in court and testify whenever called upon and they should be paid a fair fee for their services. By their appointment it would be known that they were acting with the backing of the best medical men in the state and the boycotting and persecution of these experts would then be obviated.

Then again, each medical society ought to be prepared to welcome a complaint against and should deal with any member against whom complaint of unethical conduct with respect to drugs is made.

But that would not reach the great difficulty because in my experience the physicians who are the greatest offenders are physicians who belong to no medical societies, hence are not subject to such control and influence. These can only be reached by some better law than any state has yet invented.

IV. Again, self-medication by way of patent medicines is a great cause of drug addiction. To affect the drug demand something must be done in this field. I do not find that drug victims utilize patent medicines to satisfy their drug craving. The minimum quantities allowed without prescription are not satisfying to drug-users. The patent medicine does its harmful work with the person unaccustomed to the drugs. These preparations may be habit producers, but are not habit satisfiers. It is generally provided by statute today that if a patent medicine contains habit-forming drugs that fact must be placed on the label. That is good so far as it goes, but the average layman does not

realize when he sees on a label the statement diacetyl morphine, codeine, dinin, heroin, or cannabis indica, that he is running any danger. Lest a habit be formed, would it not be well to state on the label in addition to the name of the drug the words, "A habit-forming drug," and a few words of warning against using it in large quantities or more frequently than directed?

It would be well, also, to gather facts to be used in some plan for a general education of warning against acquiring any of the drug habits. It is startling to learn how short a time it takes to acquire a habit. Suppose it were known that to take a quarter of a grain of morphine daily for two weeks would start a habit, would the knowledge of this fact not be a great deterrent? A bottle of a cocaine catarrh cure snuffed regularly will start a habit. Such facts as these ought to be made public and they would deter many from carelessly dosing themselves with these poisons.

V. Lastly, "hereditary conditions" have been named as a cause of drug addiction. I have only one suggestion to offer under this heading. Feeble-mindedness has been found to be a predisposing condition leading to prostitution. Over 50 per cent. of the prostitutes in a large city of the United States were by the Binet test found to be what are known as feeble-minded. Experience shows that many prostitutes are habitual drug-users. I have often wondered if perhaps there might be a relation between feeble-mindedness and the drug habits. Perhaps feeble-mindedness is a predisposing cause in many cases; whether

or not there is a connection would be worth finding out. This could only be done by a careful chart study in some institution where the mental life of drug addicts is carefully tabulated. If it is a predisposing cause some education to fortify the feeble-minded person against this weakness could easily be begun in the early years; moreover, when such individuals are known and classified, extra care could be taken by medical men in prescribing for them.

I have pointed out only a few of the possible measures for restricting the demand for drugs as a way of suppressing the drug vice. The measures aimed to restrict the supply must of course still be continued. I am only urging that these other preventive measures affecting the demand might wisely be added.

"These things ought ye to have done and not to have left the other undone."



FRAUDULENT INFANTILE PARALYSIS "CURES."

THE DEPARTMENT OF AGRICULTURE INSTRUCTS FOOD AND DRUG INSPECTORS TO WATCH INTERSTATE AND FOREIGN SHIPMENTS FOR FRAUDULENT REMEDIES.

Officials of the Department of Agriculture, charged with the enforcement of the Food and Drugs Act, expect that the outbreak of infantile paralysis will tempt unscrupulous persons to offer for sale so-called "cures" or remedies for this dread malady. They, therefore, have issued special instructions to the food and drug inspectors to be particularly alert for interstate shipments or importations of medicines, the makers of which allege that they will cure or alleviate this disease, for which, at the present time, no medicinal cure is known. The officials also warn the public that any preparation put on the market and offered for sale as being effective for the treatment of infantile paralysis should be looked upon with extreme suspicion. Inspectors, accordingly, have been instructed to regard as suspicious, and to collect samples of, all medicines in interstate commerce for which such claims are made. Makers of such fraudulent remedies will be vigorously prosecuted whenever the evidence warrants action under the Shirley Amendment to the Food and Drugs Act. So-called remedies for infantile paralysis, which are offered for import into the country, will be denied entry.

The food and drugs officials are particularly watchful in this instance because it has been noted in the past that, whenever a serious epidemic exists, unscrupulous dealers prey upon the fear or ignorance of the public by flooding the market with worthless, hastily prepared concoctions, for which they assert curative properties which have no foundation whatever in

fact. In the present instance, inspectors already have discovered shipments of a few such mixtures.

The Department will do everything it can under Federal law to protect that portion of the public which is extremely credulous in times of panic and which will grasp at anything which promises protection or relief. The sale of such products at this time, the officials point out, is particularly threatening to the public health because many persons, relying on the false statements of impostors, neglect to secure competent medical advice. As a result, not only is the safety of the patient endangered, but in the absence of proper sanitary precautions, the likelihood of contagion is greatly increased.

It must be understood, however, that the Federal Food and Drugs Act applies only to products which are shipped in interstate commerce, that is, from one state to another, or which are offered for import or export, or which are manufactured or sold within a territory or the District of Columbia. Products which are made and consumed wholly within a single state are subject only to such state laws as may apply and are under the control only of state health officials. The Federal law does not apply, for instance, to patent medicines made within the state of New York and sold in New York City. Persons buying or using a "remedy" made in their own state, therefore, must rely on the protection accorded them by their local health authorities.

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PRACTICAL USES OF CANCER STATISTICS.

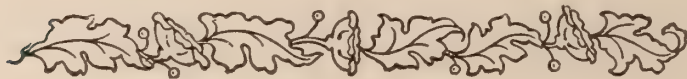
The cloud of controversial dust that has been raised over the question of the increase of cancer tends to obscure the vision of the practical problem which this disease imposes on the community and on public health officials. There is some danger of reaching the unfortunate conclusion that unless cancer is proved beyond the slightest possibility of doubt to be steadily increasing no clear duty of combating its ravages rests upon the public and the medical profession. In other words, over emphasis of the relative significance of the disease with reference to the factor of time may lead us to overlook its relative significance with reference to other diseases which afflict mankind, as well as its present absolute importance as a cause of death. An easy method of rectifying the vision and one that every health officer should occasionally indulge in, not only as regards cancer but in order to illuminate his whole field of work, is to study the simple graphic chart which prefaces the Census Bureau's Report on Mortality Statistics for 1913. This diagram shows cancer in fifth place among the leading causes of death, with a fatality rate which, if applied to the estimated population of 1915, would indicate a total of over 80,000 deaths from this disease in the United States during that year.

With respect to cancer as with the other diseases, it would seem futile to question the broad lessons of this chart. Undoubtedly the improvement of statistical methods and increased accuracy of diagnosis would bring changes in the totals and possibly in the relative positions of some of the chief causes of death.

Such corrections, however, could hardly invalidate the present conclusion that cancer ranks among the chief causes of mortality and exacts an annual toll of life so high that all possible efforts on the part of organized society are called for to control its ravages. The present statistics, however imperfect, may surely be relied upon to point the way to the health officer's chief problems. Studying the Census Bureau's figures, many a well trained and thoughtful sanitarian must regret the time and energy which one-sided and over stimulated public opinion compels him to spend on the relatively insignificant problems of nuisance abatement and minor food adulterations, while really important work has to be neglected. Cancer undoubtedly occupies a high place among the more vital health problems. While it is not an infectious disease within the old-fashioned health officer's purview, there is much that the modern health department, with its diagnosis laboratories and its systematic propaganda of public health education, can and ought to do to reduce the total of unnecessary deaths from the malignant diseases by securing their earlier recognition and treatment. The plural is purposely used, for pathologists now regard cancer not as a single well defined disease, but rather as a popular name for a group of allied but differing diseases, with varying causes, courses and results, still further complicated as they attack different organs and parts of the human mechanism. The separate and careful study of these varieties of cancer with due regard to sex, age, race and organs affected and to the conditions under which they arise may possibly contribute as effectively to the final solution of the problem of malignant disease, as any experimental work in the laboratory. These prosy statistical investigations are less likely to be heralded in the newspapers than demonstrations of cancer heredity among mice, but the practical results may eventually be quite as serviceable to humanity.

Though the question of cancer increase may be over emphasized it is undeniably important to have it settled in order that more accurate direction may be given to efforts to control the scourge. If the group of malignant diseases is not only a great but a constantly greater liability on the health ledger, a rational system of community accounting must seek to determine how and where it is undermining our credit. In other words, refined and improved statistical methods must be applied until they tell us just how the increment manifests itself, in what countries, among what races, at what ages, and whether there is a uniform increase or decrease when the death-rate is analyzed according to organs and parts of the body. In this direction information never before supplied in this country will be available with the publication of the special monograph on cancer mortality now in preparation by the United States Census Bureau. This report will show for the first time in the United States registration area and all its local subdivisions, the incidence of cancer on some thirty organs and parts of the body with appropriate separation according to sex and race. Moreover, unprecedented effort has been made in this report to classify the returns according to certainty or uncertainty of diagnosis.

Without doubt, however, the most useful contribution to this line of investigation so far actually published in this country is Frederick L. Hoffman's recent work on "Mortality from Cancer Throughout the World," reviewed elsewhere in this number. The volume is a mine of practical information for public health officials as for other lay and professional students of this disease. Not the least valuable service rendered by Doctor Hoffman is his insistence on the pragmatic standard of sufficient accuracy for working purposes in American vital statistics as they stand today. The author is too experienced in this field not to recognize the limitations and disadvantages under which causes of deaths are determined, registered and tabulated under our varying laws and jurisdictions. Yet conspicuously among American statisticians Doctor Hoffman has constantly emphasized the practical and social bearings of his profession and in his latest work he has again driven home his conviction that vital statistics are a guide to practical effort and not a metaphysical discipline. Transcending questions of somewhat more or less which might result from mathematical refinements, he holds his vision steady upon the broad conclusions which stand out from the great mass of cancer data he has accumulated. Though he insists that cancer is much more of a menace than has hitherto been supposed, and holds strongly to his belief that the recorded increase in the death-rate reflects for the most part a real increase in the disease, the author nevertheless does not content himself with dogmatic assertions. There are few localities that have escaped the sweep of his comparative method and many an American registration officer will find his own reports here tabulated along with those of cities and areas all over the world, to the end, incidentally, of emphasizing significant differences which the author regards as proving beyond question that variations in the cancer death-rate are real and due to local factors of fundamental importance rather than to any fault of diagnosis and registration. To the further study of these stimulating questions and to the improvement of technical methods, Doctor Hoffman urges us in full faith that perfected statistical analysis has a brilliant future of service to humanity in assisting in the progressive reduction of this ancient fortress of human suffering.



PHYSICAL EXAMINATION OF EMPLOYEES.

JOHN B. ANDREWS,

Secretary, American Association for Labor Legislation.

Read before the Industrial Hygiene Section, American Public Health Association, Rochester, N. Y.,
September 10, 1915.

PERHAPS no single practice in the field of health has excited more bitter opposition in the past few years than has the physical examination of employees. Although individual medical examination admittedly furnishes almost limitless possibilities for the promotion of personal and industrial hygiene, and although it is freely admitted that we are practically certain to have more physical examinations rather than less in the immediate future, the practice has recently aroused the bitter antagonism of organized labor. This opposition has come as a shock to many well disposed citizens, including some physicians and some employers. It is a matter of practical interest to those concerned with industrial hygiene to inquire "Why this opposition?"

Physical examination of employees was first instituted on a large scale in this country by those private employers who took the lead in developing what they once proudly called "welfare work." (The name has gone somewhat out of fashion of late.) The National Cash Register Company made physical examination of applicants for work as early as 1901. The practice spread, particularly among those large employers who like to do things for labor and are at the same time strong enough to ignore labor's desire to tell them what it wants.

A little later the popular interest in efficiency gave a "scientific" handle to the philanthropic welfare movement and labor became alarmed. But it was not until workmen's compensation laws furnished an obvious financial motive to some employers—especially the "self-insured"—to weed out the poorer risks that the practice of physical examinations became widespread and caused a determined outburst. The reason for the financial incentive is not hard to find. President De Leon of the Casualty Company of America has said medical examination of employees is the "preventive basic principle" of workmen's compensation insurance, and as such it serves to reduce the cost of insurance. The workers have sensed the relation between the two movements, and down in Ohio where they still have a compulsory accident insurance fund the State Federation of Labor last year went so far as to order the introduction of legislation to make it a penal offense for any employer to ask or require a physical examination of his employees!

Last spring I wrote to about twenty friends who are prominent leaders in their respective labor organizations and asked them to tell me what they thought about the desirability of physical examination of the workers. Without exception a vigorous protest

against medical examination came with every reply. Several of these correspondents admit the value of physical examination to workers in especially hazardous employments, as, for example, under compressed air and in the lead trades. But they are emphatically opposed to its general introduction because, they maintain, many workers would lose their jobs. Not only physical unfitness, they declare, but also activity in a labor union would cause the dismissal of employees under the pretext of safeguarding health. A prominent officer of the International Iron Moulders' Union—one of the most conservative and active leaders in the labor movement—wrote me as follows:

In a general way I am most emphatically opposed to any physical examination of employees. Physical examination conducted under private auspices, that is, by physicians in the employer's hire, should not be tolerated for a moment.*

But note his conclusion:

If the state would meet all of the necessary expenses of treating diseased workmen until their health had been restored . . . I might not have as strong objections.

Frequent reference is made to examinations forced upon their employees by employers who are "self-insured" under workmen's compensation laws. It is charged that each firm is a law-maker for itself when it makes its own rules relative to physical examination and establishes for itself the physical standard which workmen must have in

order either to secure employment or to retain present positions.

A California labor editor wrote recently:

There seems to be an epidemic on among employers for the physical examination of employees. . . . These examinations are conducted more in the interests of profits than for the improvement of health conditions, and labor must insist that there shall be a well-defined limit to them until such time as ample provision shall have been made for the safeguarding of the health of the worker and caring for those excluded from the privilege of working because of the examinations.

However, the pioneer work of physical examination has been pushed forward both scientifically and unselfishly by many American employers. Particular mention should be made also of the admirable work of education among employers accomplished through such organizations as the Chicago Tuberculosis Institute and the Life Extension Institute in New York.

Medical officers, describing the work of their respective firms, agree in praising the good results of medical examination. This practice has, according to them, benefited the firm by increasing the efficiency of the worker. It has benefited both the firm and the worker by eliminating many sources of contagious diseases and by raising all workers to a higher standard of health. Doctor Goldwater, Commissioner of Health of the City of New York, has given a big impetus to medical examination which he calls "the next step in preventive medicine."

In fact, when we turn to public and educational authorities in search of qualified opinions regarding physical examination, we find that many Amer-

* He mentions, however, as exceptions the examination of the eyesight of locomotive engineers, and the examination of workers in peculiarly unhealthful industries for the purpose of studying the effects of the occupation upon health.

ican cities have introduced medical inspection of school children; at least seventeen of the larger colleges and universities require thorough medical examination of all new students, which is followed in some of these institutions by periodic reëxamination and free treatment. Applicants for the army, navy, police and fire departments, and civil service employees, are also commonly required to present certificates indicating a certain physical standard of health. A suggestive point to be noted is that most of these groups, in so far as they are gainfully employed, are also provided with some form of public sick leave or pension during incapacity.

Voluntary efforts to meet the need of sick relief have been made by many employers. Often these attempts have been in the form of mutual aid societies, largely supported by the workmen and sometimes controlled by the employers. The relief afforded has frequently been inadequate, and the control has often been irksome or repressive. In answering the question "What advantages do you find in physical examination?" one employer confessed:

There is a double purpose in our examinations. Ostensibly they are for the Mutual Aid Association but in reality for the company; thus a double function is performed.*

Medical examination of workers has been undertaken not only through voluntary efforts of employers, but also as the result of legislative enactment. In so far as industrial workers are concerned, legislation is fragmentary but

steadily increasing in extent. Physical qualifications established by law are of four kinds: (1) reasonable immunity from the trade malady characteristic of the employment; (2) freedom from a trade malady contracted in the course of employment; (3) freedom from a contagious disease which might be passed on to other workmen or to consumers of the product; and (4) freedom from physical defect of such nature as to interfere with the proper performance of duty. It will be noted that the first two qualifications look toward the health of the workman himself, and that the last two look mainly toward the health and safety of other persons.

Disqualification because of susceptibility to a known occupational disease is found at present in only two American laws, but is more common abroad. The New York and New Jersey statutes regulating work in compressed air require that applicants must be found physically qualified by a physician paid by the employer, and these laws also exclude persons addicted to the excessive use of intoxicants.

It is obvious, however, that merely debarring from entrance to an unhealthy trade those demonstrably susceptible to its dangers is insufficient protection. The worker's real power of resistance to a specific hazard often cannot be determined until he has been exposed to it, and if he begins to show symptoms of succumbing he cannot be too quickly removed.

Hence arises the necessity for the second disqualification, illness from a trade malady contracted in the course of employment.

*100 Per Cent: The Practical Magazine of Efficient Management, Vol. 5, No. 2, August, 1915, pp. 64-65.

Most common occupational diseases are of such slow inception that a capable physician can detect them in their early stages before their cumulative effects have become serious. To make sure, therefore, that the originally healthy employee is in fact successfully resisting the risk with which he is surrounded, the initial examination, when it is given, must be supplemented by periodical reexaminations at intervals graduated according to the degree of risk. Sometimes periodic examinations are required even when there are no restrictions as to entrance to the trade.

Such is the case with the monthly examinations required under the "lead laws" of the important lead using states. The Ohio and Pennsylvania laws apply to the manufacture of certain of the more poisonous lead salts, such as white lead, red lead and arsenate of lead (Paris green), while the later New Jersey statute covers also the manufacture of pottery, tiles, or porcelain enameled sanitary ware in so far as lead is used. In all of these states the physician who discovers a case of lead poisoning must report it not only to the state departments of labor and of health, but also to the employer, who after five days must not continue the "leaded" employee in a dangerous process nor return him thereto without a physician's written permit. Earlier laws in Illinois and Missouri cover wider ranges of related industries, including zinc smelting and work with arsenic, brass, mercury and phosphorus, but do not require the removal from danger of workmen who show symptoms of the resultant diseases.

Provisions for regular examinations are also found in the two American compressed air laws already mentioned. Under these the examination must be repeated after the first half day's work, on returning to work after ten days' absence from any cause, and after three months' continuous employment, and workmen who have ceased to be qualified must be excluded.

In the more dangerous lead trades workers are subject to regular examination in nearly all European countries, and in Belgium a worker who is attacked by plumbism at frequent intervals must be excluded from lead occupations permanently. England and Germany, moreover, require examinations both in alkali chrome works, where corrosions of the mucous membrane are common, and in rubber vulcanizing works, where there is danger from the noxious gas bisulphide of carbon. France requires similar examinations in compressed air work.

The frequency of examination varies from once a week in the British white lead industry, to every six months among German painters, although once a month, as in the American lead trades, is the most usual period. In the Netherlands stone masons are entitled to medical examination at the employer's expense once a year.

In order that the advantages of cumulative experience may not be lost, a factory record of the results of medical examinations, especially if they result in findings of disease, is nearly always required, and must usually be kept by the examining physician. In Germany this record is called a "control book," and must contain the name of the person keep-

ing it, first and last name, address and age of each workman, date of his entering and leaving the employment, date and nature of his illness, date of his recovery, name of the factory physician, and dates and results of the medical examinations. The employer is responsible for the correctness of the record, and must show it to the factory or medical inspector on demand.

The third physical disqualification, contagious disease, is applied occasionally in bakeshops and in other food establishments, while physical defect which might interfere with proper performance of duty is mentioned in a few states which require an examination of railroad employees for color blindness or other defective sight.

From this system of medical examination the employers gain, as has been pointed out, more efficient workers. For the physician, also, the practice of examining large bodies of men at the place of employment will lead to added insight into the trade causes of disease, an insight which is as yet only rudimentary. The advantages to the workmen, gained by exclusion or timely removal from a disease-breeding occupation, may outweigh the hardship due to temporary loss of wages while awaiting recovery or securing other work. Even this wage loss, when exclusion is due to illness, can in large part be taken care of by the extension of workmen's compensation to em-

brace occupational diseases and finally by the institution of systems of public health insurance.

Furthermore, the workmen's present objections to medical examinations conducted by physicians hired by employers would disappear when the examinations were undertaken by a staff of independent physicians employed by the insurance funds. The loss of employment on account of ill health will be more than counterbalanced by the opportunities for quick recovery when we have a system of compulsory health insurance through which every workman suspended on account of physical unfitness will be entitled to sick benefit administered not by the employer and his hired physician alone, but by representatives of employer, employee and the state.

In such a measure it is highly desirable that prevention be emphasized, so that the introduction of a compulsory health insurance system will lead to a campaign of health conservation similar to the safety movement resulting from workmen's compensation. A bill with this end in view has already been drafted by the social insurance committee of the American Association for Labor Legislation.* In this dual campaign for health insurance and health conservation we need the cooperation of physicians, employers and workmen.

* Copies will be mailed upon request addressed to the Association headquarters, 131 East 23d Street, New York City.

LATEST FEATURES IN THE DIAGNOSIS AND PREVENTION OF SOME OF THE OCCUPATIONAL POISONINGS.

W. H. RAND, M. D.,
Washington, D. C.

Read before the Industrial Hygiene Section, American Public Health Association, Rochester, N. Y.,
September 9, 1915.

Doctor Rand herein reviews some of the recent work done in other countries in connection with the problem of industrial poisonings as distinguished from infection.

THE scope of this paper and its limitations are both indicated in the title.

It takes cognizance of recent studies in the diagnosis and prevention of a few *occupational poisonings* (emphasizing alike the adjective and the noun), but ignores the infections, anthrax, hookworm disease, etc.

The data cited in this sketch are derived mainly from foreign sources, although material equally as valuable might have been obtained at home. It may be assumed, however, that every member of this Association is familiar with the contributions to hygienic progress made by our own countrymen; whereas the scraps of information that have fallen in the writer's way may not be accessible to all.

LEAD POISONING.

The quest for positive, early evidence of lead absorption (antecedent to clinical symptoms) has been vigorously prosecuted for many years; for investigators everywhere recognize the

importance of diagnosis during the pre-toxic, or so-called latent stage, since preventive measures avail little at a later period.

DIAGNOSIS.

The annals of medical research since 1912 show that Teleky of Vienna regards icterus alone as a characteristic sign of plumbism (1).

Doctor Boettrich, sanitarian for twenty-five years in an accumulator factory, holds that for diagnostic purposes a weekly medical examination is necessary, with microscopic, chemical and physical blood tests, urinary analysis and determination of the blood pressure (2).

Professor Biondi's discovery of lead in the blood plasma is proclaimed by Giglioli as "a fact of the highest importance for the purpose of diagnosis (3)."

Embsen says that hematoporphyrinuria is an early and nearly constant sign, and (if fever, and disease of the heart and liver can be excluded) it is pathognomonic (4).

Professor Schmidt of Leipsic considers that blood examinations and urinary analyses are reliable tests for the early detection of plumbism. Basophile granules and nucleated cells are of less value (5).

Sir Thomas Oliver gives the clinical histories of fourteen cases of plumbism in which the diagnosis was established and the poison eliminated by means of the double electric bath (6).

Giglioli maintains that alimentary albuminuria is a sign of incipient saturnine nephritis. To a suspect he administers the whites of six eggs, and then, at intervals of three hours, tests the excretion for albumin. Its presence determines the diagnosis (7).

Hayhurst announces that "The detection of paresis, preceding paralysis, can be made early, in the case of the arms, by the use of the hand dynamometer (8)."

In practice, even when the diagnosis is clear, doubts often exist as to the source of the poisoning; for it may prove to be extra-occupational, as in the following case:

Years ago there came under my notice a dairyman whose home was in the country, but who drove into the city every morning to serve milk to his customers. He had some of the indicia of lead poisoning. But in reply to questions only negative answers were returned. The water supply on his farm was neither pumped nor piped for use. It came from a spring near the kitchen door.

He declared that he never quenched his morning thirst with potations from the cans of *aqua lactis* which he dispensed.

It was then suggested that possibly the tin-foil wrapper of his tobacco might have leaded him. He curtly interrupted, "I don't use tobacco."

Baffled but not discouraged, my next endeavor was to obtain a detailed account of his personal habits; and the information elicited showed that it had been his custom, after making his daily rounds, to take a drink of beer before returning home. Beer drawn from the wood? No, bottled beer.

Procuring five bottles of this beverage, it was discovered that in four of them there were respectively three, two, four and seven bird shot which had been used to cleanse the bottles, and had not been shaken out. Here, then, was the *fons et origo mali*.

PREVENTION.

For the prevention of lead poisoning (apart from the practice of personal hygiene), the chief requisites are suitable sanitation of the workshop, and mechanical appliances for the suppression or elimination of the poisonous dust and fumes of lead.

Hence, in this department, the architect, the sanitary engineer, the machinist and the factory inspector take precedence of the laboratory worker and the clinician. In passing it is pleasant to note that the achievements of these specialists are admirable examples of ingenuity and effectiveness.

It must be borne in mind that not all operations in a given industry are equally dangerous to health; indeed, many of them may be wholly free from risk. With repetition and emphasis Hayhurst dwells upon the im-

portance of designating the particular *process* in the execution of which the workman is exposed to health-hazards.

In industries where lead and its compounds are employed, protection is needed only by such workmen as are engaged in the processes which generate dust and fumes. Where these are evolved, hoods, exhaust fans, respirators and masks become indispensable.

A miscellaneous assortment of preventive measures may be grouped together:

Devoto arrests plumbism by administering a hot bath, following it immediately with pilocarpine hypodermatically (9).

Lazana advocates the abandonment of lead and the adoption of lithopone or innocuous zinc colors as a base for paints (10).

Tauss recites the experiments made by the Austrian government to discover a substitute for lead colors. Thirty-five leadless paints are on the market in Austria, but none are quite satisfactory (11).

Landis reporting on the processes of enameling and glazing in the pottery industry, remarks that lead poisoning has been entirely eliminated by the simple expedient of having two rooms for freshly glazed wares. Each is flushed out after use (12).

Bunge says that in the enameling of porcelain, etc., lead "may be perfectly replaced" by a mixture of borax and barium salts (13).

Ranelletti affirms that persons with normal livers are relatively immune from lead poisoning, but that no one with congenital or acquired hepatic insufficiency should work in lead (14).

Rambousek relies wholly on sanitation and hygiene for safeguarding the workman (15).

In this connection attention is invited to the admirable rules for the personal hygiene of lead workers formulated in one of the recent reports of the Ohio State Board of Health (16).

Of course there is no natural immunity from plumbism, and it is impossible to mithridatize oneself so as to be proof against it. But that strict observance of hygienic precautions is a guaranty of exemption from lead poisoning appears to have been demonstrated by a recent report of the Massachusetts State Board of Health in which it is said that lead poisoning is "almost unknown in the six home establishments visited (17)."

It is Oliver Wendell Holmes who divides men into two classes—those that say "If" and those that say "As." The unpractical man speculates on what might be *if* things were different; the efficient man deals with things *as* they are. The dreamer says, If we can abolish the use of lead, mercury, etc., in the trades, there will be no more occupational poisonings. The hard-headed hygienist replies, As conditions are at present, it is impossible entirely to prohibit the use of poisons in the industries. The only feasible plan is to reduce to a minimum the inevitable industrial risks by instituting systematic measures of shop sanitation and individual hygiene.

Economic considerations affect the situation. For it would impose an intolerable burden upon industry in some instances to require it imme-

diately to install an ideal sanitary equipment. However, corporations are generally watchful as well as enterprising, and employers are usually found among the foremost advocates of health regulations.

MERCURY POISONING.

The direct diagnosis of occupational mercury poisoning is not difficult. The black teeth of the "carroters" (the men who brush with acid nitrate of mercury the fur used in felt-hat factories) and the ulcerative stomatitis of the cutters in this industry are characteristic signs of hydrargyris.

Innocuous substances have in part replaced this metallic poison in some of the trades, so that in the manufacture of felt hats alone is the risk of mercurialism at all formidable. Many futile attempts have been made to find a substitute for the mercurial—the only preparation yet in sight which is capable of effecting the peculiar changes in the texture of the fur that are requisite to fit it for the felting process (18).

A liquid successfully employed by the Parisian firm of Jourde et Cie. and adopted later by a New York establishment employing 1,800 workmen led to the hope that mercury might be superseded by this non-poisonous preparation.

Lussigny's solution, called "Eureka," having potassium and sodium as its base, was heralded and introduced into a Russian factory as a perfect succedaneum of mercury. But this mixture has proved unsatisfactory; and though French chemists have proposed other felting compounds,

their cry of "Eureka" serves only to discover the nakedness of their claims.

PREVENTION.

Glibert says that a Belgian plant for a considerable period used a machine for carroting, but for economic reasons has had to abandon this mechanical process. From a hygienic point of view the failure of the device is regrettable (18).

To neutralize mercurial vapors, Meyer recommends that one half liter of ammonia be sprinkled on the floor of the shop at night. Merget prefers chlorine, since the combination of mercury and chlorine vapors forms a harmless compound (calomel) (19).

The best preventives, however, are the wearing of gloves and respirators, care of the teeth, the use of hoods and exhausts, and rigorous personal hygiene.

BENZINE POISONING.

Benzine (called by several aliases in the trades) is a product of petroleum distillation of variable composition, and a hydrocarbon of the fatty series. It is not to be confounded with benzol which belongs to the aromatic series, and is a derivative of coal tar.

DIAGNOSIS.

The characteristic symptoms, coupled with a knowledge of the patient's occupation, suffice for diagnostic purposes. There is exhilaration resembling that of alcoholic inebriation, with headache, nausea, hallucinations, and, in susceptible subjects, loss of consciousness and coma. In laundry workers the vapor often

causes vertigo and gastric derangements.

The fluid is used as a solvent for caoutchouc and fats, and for making varnish, cleaning gloves, etc. It forms the menstruum for many paints and enamels, and is known commercially as "banana oil" on account of the odor of the amyl nitrate which it contains.

PREVENTION.

A pamphlet issued by the Travelers Insurance Company of Hartford urges that, when this mixture is handled in a confined space, special attention should be paid to shop ventilation, and that "the men should be provided with respirators or with oxygen apparatus (20)."

Dammer suggests that it is obviously for the interest of the employer to prevent the escape or benzine vapor, and advises that cleaning be done with this agent in closed drums so that the benzine may be conserved for further use (21).

Bunge remarks that "the requirements of hygiene in this instance coincide with those of economy (22)."

TURPENTINE POISONING.

This form of occupational intoxication is always acute. It could hardly become chronic, because of the rapid elimination of the poison from the system.

The diagnosis is made by observation of the distinctive symptoms. In closed rooms turpentine vapor causes headache and gastric disturbances, but these effects pass off

after a few minutes' sojourn in the open air. Long-continued exposure to the fumes induces drowsiness or its opposite condition, insomnia, together with strangury (a common affection among painters). The urine is said to have the odor of violets.

Locally turpentine vapor produces irritation of the conjunctiva and of the respiratory mucous membrane. In fluid form it acts upon the skin, causing dermatitis and painful ulcerations.

PREVENTION.

The diffusion of turpentine fumes in the work-room should be prevented by means of hoods and exhaust pipes which capture the vapor at its place of origin and remove it by strong aspiration. Good general ventilation is also essential. Rubber finger-tips or gloves serve to protect the hands from contact with the oil.

*

*Mr. Chairman and Members of the
Industrial Hygiene Section:*

This little excursion into the partly unexplored region where the pioneers and apostles of industrial hygiene are at work has filled me with admiration and delight—admiration for the devotion and untiring zeal with which they pursue their tasks, and delight to find that, one and all, they seem inspired with the single purpose of making scientific research subserve the public good.

Solicitous neither to controvert the opinion of another nor dogmatically to assert their own, they fling their evidences into the light and stand on

the facts. The spirit that animates them finds felicitous expression in the generous Horatian challenge:

"If a better system's thine,
Disclose it freely or make use of
mine."

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TECHNICALLY GUILTY—MORALLY JUSTIFIED.

A little after 10 p. m., Thursday, June 22, and after being out nearly a week, the jury in the Wine of Cardui case brought in a verdict for the plaintiff and assessed the damages at 1 cent. The Chattanooga Medicine Company charged the American Medical Association with having libeled it when the *Journal* declared, among other things, that the business had been built on deceit, and that Wine of Cardui was a vicious fraud. For this alleged libel it asked that it be given \$100,000; it was given \$0.01. As most of our readers remember, two suits were originally brought against the Association and the Editor of the *Journal*. One was a personal suit for \$200,000, brought by John A. Patten, formerly chief owner of the Chattanooga Medicine Company; the other was a partnership suit for \$100,000 brought by John A. Patten and his brother, Z. C. Patten, Jr., doing business as the Chattanooga Medicine Company. The suits were based on two articles that appeared in the *Journal*, April 11, 1914, and July 18, 1914, respectively. The cases came to trial March 21, 1916. On April 26, in the middle of the trial, John A. Patten died, and the personal suit was automatically abated. The partnership suit, however, was continued and this case went to

the jury Friday, June 16. The case is by far the most important of its kind that has ever been tried. In addition to 498 depositions which the "patent medicine" concern took through the South from women and from doctors of a certain type, the company also put ninety-seven witnesses on the stand to testify in its behalf. The American Medical Association took only eight depositions, but did put on the stand ninety-three witnesses, among whom were some of the best known physicians in the country. The trial and the facts that led up to it could furnish texts for many interesting comments. The spectacle of a scientific organization, in its attempt to safeguard the public health, having to assume responsibilities that rightly belong to state or Federal agencies, is but one of several anomalies that characterize this case. Viewing all the facts in the case and remembering the heavy damages asked by the plaintiff, the medical profession may interpret the verdict thus: Technically guilty; morally justified! To the Association a moral triumph; to the "patent medicine" interests a Pyrrhic victory.—*Journal of the American Medical Association*.

SCIENTIFIC MANAGEMENT IN INDUSTRY AND WHAT IT INCLUDES.

DR. GEORGE M. PRICE,

Director, Joint Board of Sanitary Control in the Women's Garment Industries of New York City. Formerly Director of Investigation New York State Factory Commission.

Read before the Industrial Hygiene Section, American Public Health Association, Rochester, N. Y.,
September 7, 1915.

I.

INDUSTRIAL scientific management has been defined by its principal exponent* as "the efforts of a factory management to obtain maximum prosperity as a result of maximum productivity." In other words, scientific management means improved methods leading to increased industrial efficiency.

The methods of scientific management are mainly applied to the human factor in industry. This is so because of the already great progress in the application of natural forces to machinery in industry; and, also because the productivity of the human factor in industry has not kept pace with the productivity of the mechanical factor; while machinery production has been increased a thousandfold during the last two centuries, the productivity of the spinner, bricklayer, carpenter, machine worker, etc., has hardly been increased at all.

The main reason, however, why the need of scientific management to the human factor in industry has become so urgent, is because of the curb which state and society have put upon in-

dustry in its relation to the human element in factory and workshop.

During the period of the rise and growth of the modern factory system the exploitation by industry of the worker has been hampered very little, if at all. The increase in wealth of nations and progress in the supply of the world's market were then regarded as the highest social ideal to which all other interests were to be subordinated and sacrificed. Only slowly and gradually and, in spite of great opposition, has a halt been put upon the exploitation of human life and health of the workers by industry. Step by step the state began to interfere with the exploitation of child and woman's labor and with other ruthless methods of the modern factory system. Not only have the state and society interfered with industrial development at the cost of the workers, but the workers themselves began to demand better conditions of labor, shorter hours, higher wages, and general improvement in their material conditions.

When modern industry found that it could not entirely rely upon the exploitation of the human factor in industry, it then concentrated its attention upon

* Frederick H. Taylor.

the perfection of the mechanical factor and the development of all the technical and mechanical facilities of industry. Now, when technical progress has reached its apogee, industry, in its desire for greater productivity, finds itself demanding higher efficiency and scientific management as applicable to the human factor.

What are the methods usually advocated by the exponents of scientific management in industry?

These methods may be summarized as follows:

(1) Improved methods of selection of employees and their assignment to such duties as fit their character and abilities.

(2) A coördination of all the parts of the establishment so that the central purpose of greater productivity should not be lost by lack of coöperation.

(3) Specialization of functions and a greater sub-division of work, involving in each process simple and elementary motions only.

(4) A speeding up of the activities and motions of the workers by competition of the different units, by incentives in the form of bonuses, premiums, etc., and by a more scientific supervision of each group of units.

(5) Standardization applied to the human element in industry as it has already been applied to machinery and other equipment.

These, I believe, include the principal methods advocated by the exponents of scientific management in industry.

II.

It is hardly necessary to plead before a section on Industrial Hygiene of the

American Public Health Association for the principle that industrial productivity and the creation of wealth, no matter how indispensable to human progress, cannot be tolerated if such progress involves danger to the health and peril to the life of the industrial population. Industrial efficiency cannot justify the sacrifice of the human element in industry. Industrial progress *must* be subordinated to the welfare of the human race.

Herein we have a valuable and sound criterion for judging the various methods included under scientific management. Whatever is inimical to health and is dangerous to life must be regarded as opposed to human progress, and whatever is conducive to the health and welfare of the industrial population must be included in rational and scientific methods of management of industry.

The majority of efficiency engineers and proponents of scientific management readily concede that there can be no industrial efficiency without a thorough sanitation of the factory and workshop.

By a thorough sanitation of the industrial establishment is meant:

(1) *The Safety and Sanitation of the Workplace Itself*—the proper construction, maintenance, lighting, heating and ventilation of the workshop, the provision for the removal of wastes and the equipment of the factory with such necessary appurtenances as dressing-rooms, lunch-rooms, wash-rooms, bath-rooms, toilet-rooms, etc.

(2) *The Conditions of Work*.—Under these may be included, beside a complete safeguarding of all parts of

the shop as well as the work and the machinery so as to prevent all possible accidents to workers, also the temperature of the shop, humidity and air conditioning, the prevention and removal of poisonous dusts, gases and fumes, and the other measures undertaken with a view of making the conditions under which work is done harmless to the workers and without any danger to their life, limb and health.

(3) *The Physical Well-being of the Worker.*—Under this heading are usually included a proper selection of workers according to their physical qualifications, a system of vocational guidance and apprenticeship and a complete system of medical supervision of the general and personal hygiene of the worker and the workshop.

Under scientific management are also included the care for the economic condition of the worker, the raising of his standard of living, the payment of living wages so as to enable him to conform to a hygienic standard of living, and also the regulation of hours of labor according to the character and dangers of the work so as not to cause undue fatigue which will lead to a loss of health and eventually a loss of industrial efficiency.

This much, I believe, is conceded and included by the advocates of scientific management. There are, however, several aspects of industrial life which are as yet not included in scientific management of industry because they are thought to be too radical or in advance of the general prevailing opinions.

These aspects of industrial life,

however, seem to me to be absolutely indispensable for the bringing about of industrial efficiency because they have such a profound influence upon the health and life of the people and because they are demanded by industrial justice, upon which industrial efficiency must be based. I refer to *social insurance*, to coöperation in the joys and profits of labor, and to a share in the management of industries.

III.

The greatest curse of the modern system of production is the insecure tenure of work, the instability of employment, the periodical, seasonal and total periods of unemployment, resulting in unemployment of large masses of industrial population, an unemployment that leads to destitution, poverty and untold misery.

No system of scientific management of industry, no industrial efficiency can ever be obtained until unemployment will be abolished, until some general system of insurance will be introduced by industry and the state so as to guarantee each worker his right to his work, or to a certain minimum standard of living during its absence.

Unemployment insurance must be included under any management of industry which regards itself as scientific or just. But more than that, besides unemployment insurance, society, industry and the state must also provide for sickness, for invalidity and for old age insurance. The worker who gives up his life in order to create the wealth necessary for society is entitled to a decent standard of living

during those periods when he is disabled from work. The provision for the sick, invalid and aged should not be a matter of charity but an act of justice and should be borne by the industry to which the worker devotes his entire life.

I claim, therefore, that scientific management of industry must include an industrial and social scheme of unemployment, sickness, invalidity and old age insurance.

There is another matter which seems to me to have been greatly neglected and which should be a part of any scientific management of industry which claims to work for industrial efficiency. I refer to the sharing by the industrial workers of the joys and profits of their industry.

Work is a normal function of the human body. But it is only *then* a normal function when the work is concentrated upon objects useful to men and society, in the creation of which there is a certain joy and pleasure in the work itself. Work becomes monotonous, tiresome, and involves undue and unnecessary fatigue when it is simply mechanical, when the worker does not see the object of his work, when the work is reduced to simple unintelligent motions and endlessly repeated movements.

No scientific management in industry will ever be successful, in my opinion, if it seeks only to simplify the movements necessary for production and converts the human worker into a mere part of the machine, a senseless spoke in the wheel of industry. Productive quantity must give way to productive quality and each worker must

be given a share of the joy of creation and be allowed to participate in the art of forming the final objects of his handicraft.

Not only must the worker be given a share in the joy of production, but he is rightly entitled to his share in the profits of production and this means more than that the worker should get his regular wage according to the laws of supply and demand. As the crew of a vessel share with the captain the proceeds of the salvage, so the crew of an industrial establishment should by rights share in the profits accrued by the captains of industry by the joint coöperation and work of the whole industrial establishment.

Finally, there is one more aspect of industrial production which must be included in a rational system and a scientific management of industries. I refer to the sharing of the workers in the management of industry itself. Monarchical systems, despotism and autocracy have proved and are being proved a failure in the political life of states and nations. With all its faults, we, in this country at least, have become advocates of political and social democracy. There is no reason why the obsolete system of autocracy, discarded in political life, should be so firmly established in our industrial system. Industrial discontent, conflicts, strikes, lock-outs and industrial war—the rise of class against class and the threatened industrial revolution—are all but results of the blind attempt of the captains of industry to prevent the participation of the large working class in the management of industries

and the result of the war of industrial corporations against the rising tide of the workers' organizations.

In a rational scientific management of industries the workers should be given a large share in the management of the shops and factories as has already been recognized in those industrial establishments, where, by a system of education and agitation, the coöperation of the workers has been gained in the sanitation and safeguarding of the work itself and in the devising of a better spirit of coöperation which is bound to result from a democratization of industry.

To sum up, therefore, my conception of a scientific management of in-

dustry is (1) that it includes a greater standardization of the industry itself, (2) that it should include a complete sanitation of the industry and complete care of the hygiene of the worker, (3) that it must include some systems of insurance against unemployment, sickness, invalidity and old age, (4) that industry must be so organized as to provide the worker with a share of the creative joy of work, as well as to give him a just share in the profits of the industry, and (5) that the worker be given an increasing share in the management of the industry, for industrial efficiency must be based not only on industrial justice but also on industrial democracy.



RURAL HEALTH AMERICA'S FIRST DUTY.

Shortly after Congress convened last winter, Senator Randsdell of Louisiana, chairman of the Senate Committee on Public Health and National Quarantine, introduced Senate Bill 2214, appropriating \$500,000 for the use of the United States Public Health Service, to be used in investigating and encouraging the adoption of improved methods of rural sanitation and especially for devising and demonstrating effective measures against malaria and typhoid, instructing farmers in the prevention of these diseases, carrying on necessary investigations and surveys, and coöperating with state and local authorities to eradicate these diseases in rural districts. Friday, July 14, in the Senate Senator Randsdell presented a strong argument for his bill. He reviewed the history of health legislation in the United States, showing that local regulation had generally been ineffective and that most of our advances in Federal legislation had resulted from disastrous experiences with epidemic diseases. As the representative of the Southern state in which the inroads of yellow fever have been perhaps most severe, Senator Randsdell is able to speak with authority and from personal observation. New Orleans' recent epidemic of bubonic plague and the brilliant work of the Public Health Service in stamping it out was vividly described. "Never again will there be an epidemic of bubonic plague in New Orleans," he said. "The people of that city realized that the conquest of this disease was one for the Federal government. . . . Today, as a result of the campaign against yellow fever and the campaign against bubonic plague, New Orleans is one of the

healthiest cities in the world." After reviewing the work of the Public Health Service and showing the limited means available, Senator Randsdell showed that in this country, in any line of progress, education is indispensable, and that, although much educational work has been done, and although the death-rate throughout the nation has fallen during recent years, this decline has been much greater in urban than in rural communities. He then discussed the economic and vital loss due to malaria and typhoid, showing that these two diseases alone cost the United States over \$900,000,000 each year, and that both diseases are almost entirely preventable. Comparing the 1915 appropriation for the prevention of human disease with that for the prevention of diseases of animals, Senator Randsdell called attention to the fact that the total amount appropriated last year for human welfare was less than two million dollars, while the amount appropriated for animal and plant welfare was nearly six million. "The problem of rural sanitation," he declared, "is not a local problem, but one which concerns the health and physical integrity of our entire nation." Senator Randsdell's speech in favor of the passage of his bill is one of the strongest public health utterances ever made before Congress. While the bill is simple in its phraseology and provisions, its passage would result in widespread and lasting benefit to the entire country, and would greatly strengthen the Public Health Service. If Congress will pass this measure, it will deserve the gratitude and thanks of the public and especially of our rural population.—*Journal of the American Medical Association.*

A COMPARISON OF BACTERIOLOGICAL METHODS FOR THE EXAMINATION OF OYSTERS.

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Read before the Laboratory Section of the American Public Health Association, Rochester, N. Y.,
September 10, 1915.

BACTERIOLOGICAL studies of shellfish, especially oysters, have received considerable attention from bacteriologists during the past twenty years. During this time considerable advance has been made in our knowledge of the biology and bacteriology of this important food. So important was the question from a sanitary standpoint that the American Public Health Association, through its Laboratory Section, appointed a Committee to consider "Standard Methods of Shellfish Examination." The report of this committee was published in August, 1911.* This was a preliminary report and presented tentative methods of procedure for the examination of shell and shucked oyster stock. Briefly the method as proposed for the examination of shell stock included the collection of twelve oysters with deep bowls, short lips and shells tightly closed; this sample to be properly packed and transferred to the laboratory for examination. The examination included the determinations of the total numbers of bacteria and *B. coli* per cubic centimeter of the shell liquor.

The Second Progress Report of this Committee† was substantially the same

as the Preliminary Report except that the recommendations included the total bacterial count upon a composite sample obtained by mixing the shell liquors of five oysters which had previously been examined individually for *B. coli*. The determination of the total count was to be made in accordance with the procedure of the Standard Methods of Water Analysis of the American Public Health Association.

The "Standard Methods" in outlining the method of determination for shucked stock recommended in the preliminary report:

1. The holding under refrigeration of the sample for twenty-four hours before the examination was made.
2. The procedure for bacterial counts to be the same as for shell stock.
3. The determinations for *B. coli* to be the same as for shell stock except that dilutions higher than 1/100 cc. are recommended.

For the Second Progress Report of the Committee on Standard Methods of Shellfish Examination, a modification of the first point is recommended, namely, that:

1. The sample should be examined immediately instead of holding for twenty-four hours.

In both reports it is stated that in the examination for *B. coli* higher dilutions should be used in shucked stock than in shell stock. *B. coli* do not

*AMERICAN JOURNAL OF PUBLIC HEALTH, Vol. II, No. 34, 1912.

†AMERICAN JOURNAL OF PUBLIC HEALTH, Vol. II, No. 34, 1912.

grow in oysters under the ordinary conditions of handling in the oyster house or during transportation, if properly iced. This is recognition of the fact that, volume for volume, there are more *B. coli* on the body of the oyster than are contained in the shell liquor, a fact which one of us (Round)* has shown.

In the examination of the shell stock the shell liquor is employed, whereas in the examination of the shucked stock the mucus which comes from the oysters after standing is used. Consequently, the examination of shell and open stock from the same lot will not give results which can be compared, due to the fact that the examination is made upon different material.

The method outlined by the Committee has been followed by practically all workers upon the shellfish question with certain changes or modifications of the method according to the ideas of the individuals. Perhaps the most variable point in the use of the method is the size of the sample employed by different investigators. In some cases five oysters only have been used in the sample whereas in many other cases multiples of five have been employed. When multiples of five are employed the shell liquors of two or more oysters are mixed and the composite sample examined as for a single oyster, the rating on the sample then being recorded as for five individual oysters. Owing to the variation in the

analysis of single oysters from the same lot, the results obtained from different workers also varied.

For the purposes of experimental investigation the writers have developed a method of examination which has to do with the meat or body of the oyster. It is believed that in view of recent work upon the bacteriology of the oyster the results obtained by the present standard methods are not comparable and do not give reliable data for experimental investigations in which it is necessary to compare the bacterial content of oysters before and after shucking and at various stages of the handling and during transportation and storage. One of us (Round)† in his work for the Rhode Island Shellfish Commission has shown the relation of the numbers and kinds of bacteria upon the body of the oyster to the numbers and kinds in shell liquor.

His work tends to show that during the winter months, which is the active season for the oyster industry, the total number of bacteria of the *B. coli* type in the shell liquor and the total number found upon the body of the oyster are about equal. But during the summer months, which include September and October, the first two months of the oyster season, when the oysters are more actively secreting mucus, there are in general many more organisms of this type on the body of the oyster than are to be found in the shell liquor.

For an investigation of the change in bacterial content during handling

*Round, L. A. Contributions to the Bacteriology of the Oyster. State of Rhode Island and Providence Plantations as Authorized by Commissioners of Shell Fisheries of the State of Rhode Island, 1914. Also Comparative Bacteriological Examination of Shell Liquor and Meats of Oysters, Jour. Am. Pub. Health Assn., July, 1916.

†*Loc. cit.*

and transportation the writers devised the following method:

Preparation of the Sample.—The collection and the handling of the sample was in accordance with the present recommendations of the "Standard Methods" except that the sample included at least thirty oysters.

Washing the Oysters.—Each oyster was scrubbed thoroughly with a stiff brush in running tap water. Immediately after washing, the oysters were placed in a wire basket, hinge end down and allowed to drain until the shells were practically dry.

Opening the Oysters.—If the oysters had not drained sufficiently so that the shells were practically dry, the excess liquor was removed by a clean dry towel. When ready for examination an oyster was held by the hinge-end between the thumb and fore finger and the lip of the shell flamed with a bunsen flame or burned off with alcohol. The opening was done with an oyster knife, previously sterilized by burning with alcohol.* Care was taken not to mutilate the oyster meat.

Draining the Oyster.—Immediately after opening, the oyster was carefully shucked into a sterile, specially constructed container, so arranged that the liquor drained into a sterile receptacle. Care was taken at the time not to allow any of the liquor to be lost. The oysters were allowed to drain ten minutes before starting the examination.

* The opening of an oyster can be facilitated by holding the oyster firmly on the edge of the bench with the deep bowl down and inserting the knife from the edge. Care should, of course, be taken not to let the edge of the shell where the liquor is to run out come in contact with anything except the sterile oyster knife.

Examination of the Shell Stock.—To 200 cc. of the drained oyster meats, opened as described, an equal volume of 1 per cent. sodium chloride solution was added. The oysters and salt solution were shaken vigorously fifty times. Twenty-five cc. of the liquor was removed into a sterile glass-stoppered bottle and again shaken fifty times with the addition of sterile glass beads or shot. The liquor thus obtained was examined by using five separate portions, conducting the examination for the total bacterial count by plating upon nutrient agar and incubating forty-eight hours at 37° C. and a duplicate set of plates at room temperature. Five separate portions of the liquor were examined for the presence of gas-producing organisms in ox-bile fermentation tubes. Colon types of organisms were confirmed by the use of Endo's medium.† The results thus obtained from the confirmed colon examination were scored upon the basis of five oysters.

Examination of the Liquor from the Shell Stock.—The liquor obtained after shucking and draining the oysters was placed in a sterile jar and vigorously shaken fifty times with the addition of sterile glass shot or beads. Twenty-five cc. of the liquor were removed into a sterile glass-stoppered bottle and an equal volume sterile 1 per cent. salt solution added, and the whole shaken vigorously fifty times with the addition of glass shot. The examination was then conducted the same as for the liquors obtained in the examination of

† Kenyon, J. J. and Deiter, L. V. On the Preparation of Endo's Medium. AM. JOUR. PUB. HEALTH, Vol. II, No. 12, p. 979.

the washings from the meats, making five determinations and scoring as above, the results thus obtained denoting the number of bacteria present in $1/2$, $1/20$, and $1/200$ of a cubic centimeter. These results were changed to score upon the basis of one cubic centimeter by multiplying by two.

Examination of Shucked Stock.—Freshly shucked stock, as obtained during the process of handling in the oyster house, was drained for ten minutes in the specially constructed container and treated as described for the examination of meats under shell stock. Shucked stock from the commercial package was examined without draining. The liquor from the commercial package was examined as described for the shell liquor under shell oysters.

During the past oyster season this method was employed in the examination of commercial shipments of shucked oysters, in which examinations

were made at various steps in the preparation of the shucked oysters for the trade. The results obtained will be fully discussed in another paper.* In these experiments as conducted, shell oysters were examined as the first step of the routine. In using the above method, a composite sample of the shell liquor was obtained at the start. Five individual portions of this shell liquor were then examined and the score computed in the same manner as for the present "Standard Methods." The scores which were obtained, therefore, would conform to the scores which would have been obtained had the examinations been made according to the present "Standard Methods." From time to time additional determinations were made on shell oysters from the same lot using the present "Standard Methods."

These results have been tabulated to show the relation between the two methods:

COMPARISON OF RESULTS OBTAINED BY METHOD DESCRIBED AND BY "STANDARD METHODS" ON THREE SAMPLES OF SHELL OYSTERS.

Sample No.	Method Described.						Standard Methods.		
	Washings from oyster meats.			Oyster liquor.		Confirmed B. coli score.	Count after.		Confirmed B. coli score.
	Count after.		Confirmed B. coli score.	Count after.					
	4 days at 25° C.	2 days at 37° C.		4 days at 25° C.	2 days at 37° C.				
1	700	95	1	1,825	375	4	1,600	75	23
2	5,200	275	2	17,500	500	6	6,000	240	5
3	180	35	3	975	50	10	1,400	100	14

NOTE: All counts are the average of five determinations.

* Bates, Carleton. The Handling of Shucked Oysters. Read before the Laboratory Section of the American Public Health Association at the Annual Meeting, Sept. 7-10, 1915.

A COMPARISON OF RESULTS OF THE BACTERIOLOGICAL EXAMINATION OF THE SHELL LIQUOR AND THE MEATS OF OYSTERS BY THE METHOD DESCRIBED.

Sample No.	Washings from oyster meats.		Confirmed B. coli score.	Oyster liquor.		Confirmed B. coli score.
	Count after.			Count after.		
	4 days at 25° C.	2 days at 37° C.		4 days at 25° C.	2 days at 37° C.	
4	2,200	450	1	1,930	430	0
5	460*	30*	5	7,550*	90*	10
6	3,000	13,500	50	3,250	1,650	100
7	1,450	23†	0	1,750	70	6
8	60	28	0	370	65	6
9	1,450‡	240‡	0	14,400‡	60‡	2
10	8,000	225	23	80,000	460	46
11	1,500	95	3	7,700	320	10
12	700	95	1	1,800	290	4
13	6,150	80	1	3,500	350	6
14	5,100	275	2	17,500	500	6
15	3,700	300	0	1,650	870	6
16	45	12	5	1,100	390	4
17	180	36	3	970	50	10
18	430	140	1	4,750	420	46

* Average of 2 determinations.

† Average of 3 determinations.

‡ Only one determination made.

NOTE: Unless otherwise stated all counts were the average of 5 determinations.

From these tabulations, it can be noted that although the total numbers of colonies developing from the samples vary between the meats and the liquors, the variation in the B. coli score was not great.

The container used in the determinations consists of a basket constructed to hold exactly 200 cubic centimeters of oyster meat. This basket allows the liquors to drain into a cylinder. The basket and cylinder are made so that the basket will set into the cylinder without touching the sides and so as to permit a cover for both. The whole container can then

be sterilized so that the oysters can be shucked into the sterile basket and drain immediately into the sterile container. An illustration of the container follows.

Previous work had convinced us that the present "Standard Methods" were not adapted to experimental investigations in which it was necessary to follow the change in bacterial content of the oysters from the time they left the beds, through the various steps in handling in the house, and during transportation, for the reason that the substances examined during the various steps were in no way comparable. During the washing process

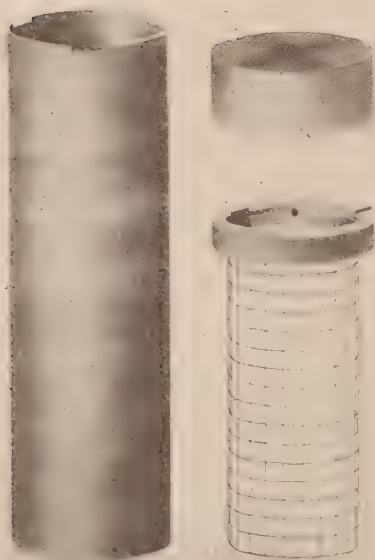


Illustration showing cylinder, basket and cover used for draining the oyster meats. For description see text.

the oysters entrap a considerable amount of water which is readily given off if the oysters are allowed to

stand a few minutes in a closed vessel. This is little more than wash water. On the other hand when the oysters are put into the commercial package they are thoroughly drained, and whatever liquor collects after the oysters are left over night in a refrigerator is mucus from the body of the oyster. For these reasons it is readily seen that a standardization of the substance examined and the method of examination is essential in investigations like the one mentioned above.

This method is applicable to the examination of oysters, either shell or shucked, at any time during handling or during shipment, and enables one to make comparable determinations. This point is shown more clearly in another paper.*

*Bates, Carleton. The Handling of Shucked Oysters Read before the Laboratory Section of the American Public Health Association at the Annual Meeting, Sept. 7-10, 1915.

THE PRUDENTIAL INSURES ITS EMPLOYEES.

The largest amount of life insurance ever written at one time was issued recently by the Prudential Life Insurance Company of America. All employees of that corporation throughout the United States and Canada got life insurance policies without any cost to them. The total amount involved is more than \$16,000,000.

All employees were insured according to the length of their service, no policy being less than \$500 or more than \$2,000, without regard to age or position, with the one exception that the company's gift does not include any of its officers or directors. No employee was compelled to submit to any medical examination.

The Prudential is the first of the great insurance companies to insure its staff so liberally.

The action follows a service disability and retirement plan for the company's employees, which has been in operation for some time.

In announcing this bonus to its employees President Dryden issued a statement in behalf of the company which read in part:

"The plan should not be regarded as taking the place of any personal insurance which the employees of the company may wish to carry. It does, however, render it possible for such employees to say to those whom they hold dear that the company's interest in their welfare insures, in the event of death, the payment of a sum sufficient to permit adjustment to the changed conditions."

OTHER FACTORS IN INFANT MORTALITY THAN THE MILK SUPPLY AND THEIR CONTROL.

GRACE L. MEIGS, M. D.,
Washington, D. C.

Read before the Public Health Administration Section of the American Public Health Association, Rochester, N. Y., September 10, 1915.

Dr. Meigs is connected with the Children's Bureau of the U. S. Department of Labor. In this paper she reviews some of the methods of attack which have been employed with success in dealing with the infant mortality problem.

INFANT welfare work is no longer a novelty or an experiment in public health work. It is no longer a necessity for speakers on this subject to urge its importance; nor is it necessary to discuss the fundamental principles upon which this work must be carried on. I am going to take it for granted, then, that every one here is convinced that no public health work is more important than the prevention of infant mortality. Beyond this I am going to take it for granted that we are agreed upon the lines of work which the prevention of infant mortality must take. Those early infant welfare campaigns which were directed almost exclusively against impure milk accomplished great things; the campaigns of today, however, have shown that we must attack many other factors in order to reduce the infant mortality rate of a community.

The essential features of all campaigns in all communities, upon which I believe we are agreed, are these:

1. The first in importance is the education of the mother and the

mother of the future in the care of herself and her baby, above all with regard to the advantage of breast-feeding.

2. Another essential is an exact knowledge in each community of the facts of the infant mortality of the community, which is obtained only through accurate birth and death registration; with a knowledge of the most frequent cause of death and a realization of the parts of the community where the mortality rate is the highest.

3. The third is a pure milk supply.

4. The fourth is the betterment of such civic, social and economic conditions as are hazards to the lives of the whole family, but especially to the life of the baby.

Dr. Holt has well summed up infant mortality as having two fundamental causes: Ignorance and poverty. Ignorance we can and must cure; poverty we cannot cure by public health measures, but we must include in our programs the protection of the poor from the community evils that are associated with poverty. By the means that I

have indicated above in outline are attacked the three great groups of causes which together are responsible for about three-quarters of the deaths of infants under one year.

The diseases of diarrhea and enteritis are those which are commonly thought to cause the most deaths, and are in reality second, claiming about 25 per cent.*

These are the diseases which are largely preventable. I have no desire to plunge you into the controversy which has raged for some years around the subject of the immediate cause of the summer diarrhea of infants, whether it is an infectious disease spread by milk, water, flies, or contact; or a disease due to poisonous substances in impure milk, or one due largely to the lessening of the baby's vitality by the action of hot weather, intensified by hot overcrowded rooms, and too thick clothing. It may be concluded for our purpose that all these factors may and do cause infant diarrhea, and that the efforts to prevent this disease must be directed against all these causes through the education of the mother. She must be taught above all the importance of breast-feeding; also the means of protecting the baby from infection as

carried by flies, conveyed by the hands or transmitted through impure milk. She must know the proper care of the baby in hot summer weather with regard to proper clothing, bathing and the ventilation of the home.

2. The congenital diseases and diseases of early infancy claim the largest number of deaths. About one third of the deaths of babies under one year are due to these causes. No more than a guess can be made as to the degree to which these diseases can be prevented; the definite effort to prevent them is that phase of infant welfare work claiming great attention at present. Two problems are here involved: (1) The ignorance of the prospective mother in the care of herself during pregnancy; (2) Improper care by physician and midwife during pregnancy and at birth.

The experiments carried on in New York City and in Boston have proved beyond doubt that through education and care of the prospective mother reduction can be made in the death-rate from these causes. The wonderful growth of this prenatal work proves that every one is convinced of the importance of work along these lines. The Children's Bureau has, during the past year, been gathering information with regard to all forms of infant welfare work being carried on in this country; we have records of prenatal work now being done in about 110 different localities.

3. The third group of diseases, those of the respiratory system, cause about one seventh of all the deaths under one year. This element of the death-rate is very difficult to touch; the definite

* Figures compiled at the Children's Bureau from the tables published by the United States Census Bureau give the following percentages as due to each of the three causes. These percentages are based on the average annual number of infant deaths for the five year period 1908-1912 and relate to the states which were in the death registration area in 1910: Diarrhea and enteritis, 25.6 per cent.; congenital diseases and diseases of early infancy, including congenital malformations, congenital debility and premature birth, atrophy and marasmus, injuries at birth, and other conditions peculiar to early infancy, 34.8 per cent.; respiratory diseases, including acute bronchitis, broncho-pneumonia, and pneumonia, 14.9 per cent.

attempt to reach it is the development of only the last few years. The New York City and State Departments of Health have this year especially attacked this problem. Here, too, the chief weapon is the education of the mother. She must be taught that breast milk and plenty of fresh air protect against these infections; that the baby must not be exposed to infection from a person suffering with a cold; and that respiratory infections in the baby must receive early treatment.

The teaching and direction of mothers who need such help in the care of their babies is, then, the chief problem at which infant welfare work centers.

I shall take for granted that we are all agreed on one more point—that efficient teaching and direction of the mother can best be accomplished first by the help of a visiting nurse, who shows the mother, preferably in her own home, how to care for the baby, and how to prepare his food if he is bottle-fed; and second, by the advice and direction of a physician, preferably at an infant welfare station, where conferences between mother, physician and nurse are held, and the baby is weighed at frequent intervals. All general methods of education by pamphlets, bulletins, lectures, newspaper articles, exhibits, contests, conferences and baby weeks are only supplementary to the work of the nurse and the infant welfare station. These two units are the essential factors in all infant welfare campaigns.

During the study of the past year made by the Children's Bureau into

infant welfare work being carried on in this country, letters were sent to public health officials and the heads of private organizations doing infant welfare work in all towns having over 10,000 inhabitants. We have received answers up to the present time from 527 cities. Of these 127 report that infant welfare stations are maintained; in 27 by the city department of health; in 8 more by municipal and private agencies in coöperation; in the remainder by private organizations alone. City departments of health are to a greater degree carrying on infant welfare work through instruction by visiting nurses, in many cases in connection with general nursing work. Sixty-six departments of health have reported such work; 8 more carry it on in coöperation with private organizations; 33 more have reported some work, which has not, however, been verified by a complete report. On the other hand, 264 private organizations are doing instructive nursing work in the care of babies. The history of infant welfare work in most communities is that it is begun usually by private organizations; after the need for it and the possibility of carrying it on successfully have been demonstrated, the work is taken over by the city health department. In many cities, as the figures I have given show, this taking over by the health department has not yet occurred.

A very successful branch of education in the care of babies is that given in the little mothers' leagues. These, as you know, were first organized in 1908 in New York City. This year the *Health News* tells us there are 200

leagues with 30,000 members in the public schools in New York City. The movement has spread to the rest of the country. The Children's Bureau has record of work in 73 cities in the instruction of young girls in the care of the baby. These leagues, which are self-governing bodies of school girls of the higher grades, receive instruction given by school physician, nurse or teacher. The results are very good. Many of these girls inevitably have the care of their little brothers and sisters in summer and need only too pitifully some instruction in how to care for them; in addition the girls are prepared for the time when they will take care of babies of their own. Without doubt, too, through these girls a strong educational influence is exerted over the whole family.

The value of all the general forms of education in infant care—pamphlets, bulletins, exhibits, is hard to measure. Some mothers, especially the ignorant foreign-born, and those needing help most of all, can be reached but very little, if at all, in these ways; upon them the visiting nurse and the infant welfare station alone exert any influence. There can be no doubt, however, that in a broad general way the influence of all that is written and said about the baby is enormous. This field of education is that which is open to the State Departments of Health. Two of these, New York and Kansas, have divisions of Child Hygiene; Ohio is organizing such a division; Massachusetts and Louisiana have branches of the State Department giving attention to the

subject. We have found that twenty-three state boards of health distribute pamphlets or bulletins on the care of the baby, many of them sending them to each mother the birth of whose baby is registered. Fourteen states include in their newspaper press service articles on the care of the baby. In many states having state health exhibits, a portion of the space is given to exhibits on infant welfare in Louisiana and Texas; these are shown in the health exhibit cars which travel over the state. In many others, the exhibits are sent about the state, and are frequently shown at county fairs. Many states have lecturers on the subject of infant hygiene.

The New York State Health Department has combined a general educational campaign in infant welfare through traveling exhibits with the specific effort to encourage the establishment of local organizations to maintain infant welfare nurses or infant welfare stations. The remarkable success of the campaign of last year, when the number of localities having stations in the state outside of New York City was increased from 12 to 32; and the number of stations from 32 to 67, will probably lead to similar campaigns in other states.

The extension departments of the Universities are doing a great deal of educational work in infant care; as are also the home economics divisions of the extension departments of the agricultural colleges. The latter, through whom federal money is expended for extension work in rural communities in coöperation with the Department of Agriculture, reach more

than any other agencies the women in the country. These departments are realizing the importance of teaching the care and feeding of babies and children, and are teaching these subjects through lectures and exhibits in their farmers' institutes, at short courses and at county fairs.

A new form of educational publicity with regard to the baby is the baby week which has been held recently in several cities in this country; in some cases with the purpose in addition of securing money for infant welfare campaigns. The first baby week was held in Chicago, April, 1914. It was planned by a committee of advertising men and women who donated their services, and the object was to obtain funds for the Infant Welfare Society. The advertising was done in many ways. A famous sculptor made a bust of mother and child, casts of which were exhibited everywhere, while pictures of it were shown on the posters. Billboard men gave space for posters, newspapers ran display articles, coupons were inserted in theater programs, signs were exhibited in all the street cars; slides were shown between films at the motion picture theaters, while films on milk and the care of the baby were shown. Milk dealers put special wrappers around bottles of milk sold during this week. A house to house canvass for money was made by a committee of women.

The New York Baby Week followed in June, 1914. This was not a campaign to raise money, but rather to educate the public with regard to infant welfare work. The same methods

of publicity were used. Especial features were excursions for mothers, baby parades, and days devoted to visiting different types of baby-saving centers, such as infant welfare stations, day nurseries, and asylums.

This year the idea of a baby week has spread rapidly. Pittsburgh, Detroit, Yonkers, Indianapolis, Topeka, Staten Island, and Grand Rapids, among others, have held baby weeks, several of which have been carried on chiefly by the city departments of health. Each city has introduced new features; all have been an expression of the great interest now felt in babies. It is hoped that each will lead to permanent work for babies, to the employment of infant welfare nurses and to the establishment of infant welfare stations.

Before I stop I want to speak of the neglected field of infant welfare work in the country, and in small towns. Up to the present time very little has been done along these lines. Just now there is a growing realization that the need of people living in the country for work of this kind is very great. This is in harmony with the fast increasing interest in all the problems of rural health and sanitation. We have not, on account of our incomplete birth registration, a definite knowledge of the infant mortality rate in most rural districts, and its relation to that in urban districts. The evidence available tends to show that the rates are almost constantly lower than in urban areas; yet does not show that they are low enough to justify the general lack of effort. It is possible that the relative proportion of deaths

due to the chief causes mentioned before varies from that which has been given as holding true for the death registration area as a whole; for instance, the proportion of deaths due to gastro-intestinal diseases may be much less. The methods for doing successful infant welfare in the country are not yet worked out. The difficulties of establishing in the country infant welfare nurses and infant welfare stations are very great. An infant welfare station with weekly attendance by mothers is usually out of the question; the nearest approach would be a permanent station with periodic examination and weighing of the baby. Such a station at a small town or county seat, where a nurse is in attendance and mothers may come for instruction and for examination of the baby, is practicable. A station of this type is maintained by the Parents' Educational Bureau, at Portland, Oregon. At Binghamton, New York, a rest club has been established with comfortable quarters and a nurse in attendance, where country mothers coming into town for shopping may leave their babies. Here the work has been developed to include the weighing of the baby and conferences between mother and nurse with regard to the care of the baby. Direct instructive work in the homes by rural visiting public health nurses seems at present the best solution of the problem, supplemented by mothers' meetings, little mothers' leagues, etc. This work must necessarily be carried on in conjunction with other public health nursing work; with tuberculosis work, rural school and general educational work. The rural nurse

cannot be a specialist. This is, however, in line with the present tendency pointed out by several speakers at these meetings against specialization in public health nursing in communities of all sizes. Many of the nurses of the Red Cross Town and Country Service are doing this infant welfare work with great success; traveling over their districts on horseback or in carriages, holding mothers' meetings, organizing little mothers' leagues in the schools, and teaching mothers the care of their babies in their homes, under the advice of the family physician.

In New Zealand the problem has not been dissimilar to that in many of our states with a largely rural population. The success achieved by the New Zealand Society for the Health of Women and Children, attested to by the fact that the infant mortality rate for New Zealand is one of the lowest in the world, is described in a small bulletin published by the Children's Bureau.* Local committees of this society are formed for small districts; the nurses of the society, each 8 in a district with a radius of about 50 miles, work through local committees, visiting each locality at stated intervals, holding meetings and conferences and visiting homes. Their work is supplemented by pamphlets and newspaper articles.

At least one County Child Welfare Society of rural women, that of Henry County in Iowa, has been formed. The association is made up from many

*New Zealand Society for the Health of Women and Children, U. S. Children's Bureau Publication, No. 1.

different women's organizations in the county, and has a purpose very similar to that of the New Zealand Society. This county society expects to work in close coöperation with the agricultural county agent.

The problem of the maintenance by rural districts of public health nurses forms part of the general problem of rural sanitation which awaits solution during the next few years.

Infant welfare work, like other public health work, has its special problems in the town and small city. Those problems are receiving much attention today; and there is evidence that infant welfare work is growing rapidly in the smaller towns. The recommendation of the Special Health Commis-

sion of New York State of 1913 was a wise one: That each town of over 10,000 inhabitants having an industrial population should support an infant welfare station and that larger cities with an industrial population should have one such station for approximately each 20,000 inhabitants. Of the one hundred and twenty-seven cities in the United States spoken of previously, which had infant welfare stations in 1914-15, forty-five had less than 25,000 inhabitants, and fifteen were under the 10,000 mark.

I believe and hope that in the next few years the development of infant welfare work in the country and the small town will be very great.



THE MIDWIFE.

The midwife is with us and in increasing numbers. She is not new to the old world. She existed in Egypt before the days of Moses. In the East and in Europe up to the middle of the sixteenth century all women were delivered by midwives. In the seventeenth century schools were established for their special training and in the past fifty years they have, on the continent, been under state control; in most European countries a thorough training is required, which sometimes covers a period of two years. In at least one country, Holland, midwives or a certain number of them, are taught at the expense of the state, in order that they may better serve the people of the rural regions.

Some of our own states hold examinations and have certain requirements of training, and in at least one city, New York, there is an excellent school for midwives. Since they are likely to become more and more a part of our national life, it behooves all our states to be alive to the need of seeing that the midwife in her line comes up to as high a standard of excellence as is demanded of the physician and that she has ample opportunity for the best of training.

The midwife fulfills a want among the poor,

and cannot be replaced by the physician, for she is doctor and nurse combined and gives her services in both capacities at a price lower than the doctor can afford to charge.

It is not to be wondered at, therefore, that in some of our cities a fourth of the children are born into their hands. As with physicians, there are good and bad midwives, well trained and ill trained, experienced and inexperienced, yet, in comparison with the physicians, their work seems not to suffer, for statistics of one of our American cities show that of the cases of puerperal infection, about half occurred in the women delivered by physicians and half in those attended by midwives. These figures should obviously be judged in the light of the character of the clientele of the two classes of practitioners, for those assisted by the midwives are undoubtedly more immune to infection, but, nevertheless, considering the amount of her training, the midwife stands the comparison well. Doubtless too frequent interference with the course of nature—meddlesome midwifery—on the part of the doctor has much to do with this statistical reproach.—*New York Medical Journal*.

MILK CLARIFIERS.

CLARENCE BAHLMAN,

Chief Chemist, Cincinnati Department of Health.

CONSIDERABLE data has been published covering studies on the pasteurization of milk. The mechanical construction of the various types of pasteurizers and the principles and results of the process are well known to public health workers.

Recently dairy-supply houses have placed the so-called milk clarifiers or milk separators upon the market. The claim is made that these machines remove filth from milk, and one is led to believe that a great reduction in bacteria is also accomplished.

A search through scientific periodicals fails to reveal any data covering bacteriological or chemical studies upon milk clarifiers. The Cincinnati Department of Health recently has had an opportunity to make such investigations, and the results seem to justify publication.

Milk clarifiers are, essentially, large centrifugal machines, capable of continuous operation at high speed. Machines of different manufacturers vary in mechanical details, but the principle governing all is the ability to throw out suspended matter from liquids by means of centrifugal force.

Our tests were made upon a clarifier driven by a steam turbine at 7,000 revolutions per minute. Eight samples of raw milk and the corresponding milk after passage through the clarifier were plated out for total bacterial con-

tent by the standard methods of the American Public Health Association, with results shown in the following table:

Test Number.	Bacteria per cc.		Per cent. increase in Bacteria.
	Raw.	Clarified.	
1	630,000	750,000	19
2	900,000	980,000	9
3	1,400,000	1,800,000	28
4	455,000	730,000	60
5	418,000	580,000	39
6	3,150,000	4,005,000	27
7	2,160,000	2,800,000	30
8	1,380,000	1,720,000	25
Average	1,312,000	1,670,000	27

The increase in bacteria is to be accounted for by the breaking apart of clumps of bacteria by the violent mechanical action taking place in the machine. The counts obtained upon the raw milk represent, to a large degree, bacterial aggregates which cannot be broken apart by merely shaking the sample before plating. Counts upon the clarified sample represent individual organisms, at least to a great extent. Thus a clump of bacteria in the raw milk will be counted as one organism, while in the clarified product the members of the clumps are counted as individuals.

The milk used in the test was cold,

and the time exposed to centrifugal force did not exceed a few seconds. This excludes all possibility of propagation, and, since large numbers of bacteria are found in the deposit in the clarifier, it follows that in reality there is some removal of bacteria by the process. Bacteria in liquids are acted upon very slowly by gravity, and adhere, in the case of milk, rather tenaciously to the fat globules. It seems then that we cannot expect any great percentage reduction, as the milk is exposed to the separating force for only a few seconds.

Fifteen cubic centimeter portions of the samples were centrifuged in the laboratory for three minutes at 3,000 revolutions per minute. A white sediment was deposited in the bottom of the centrifuge tube in all samples. In all cases this deposit merely covered the apex of the tube and could not be measured, although the raw milks showed slightly more residue than was obtained from the clarified milks.

The appearance of sediment when centrifuging the clarified milk in the laboratory, at a lower speed but for a longer time than at the bottling plant, indicates that all matter capable of being thrown out of milk is not completely removed by the clarifier. In the removal of bacteria by centrifugal force or gravity, a great force momentarily applied will not accomplish as much as a lesser force acting for a longer time.

The ordinary sediment test, in which pint samples of milk are filtered through cotton disks, was applied to these samples. The raw milks showed the usual residue of short hairs, dust,

etc. The clarified samples were entirely free from visible suspended impurities. These machines, therefore, completely remove all gross suspended dirt from milk.

The sludge or residue in the clarifier is a grayish mass of unsightly appearance. The material deposited immediately next to the centrifugal bowl is dark gray, very rubbery and tenacious, and drier than the upper layers, which are light gray slimes. The layers are not sharply defined, but the difference between the lower rubbery layer and the upper white, almost fluid layer, is very marked.

Examinations of representative portions of the sludge showed:

Moisture.....	60.0%
Solid matter.....	40.0%
Bacteria per gram.....	950,000,000

Microscopical examinations of stained smear preparations showed that amorphous matter having no definite structure greatly outnumbered the cells and organisms. Bacilli, cocci, streptococci, epithelial and pus cells were present, but no acid-fast bacilli were found.

The sludge, after being dried and pulverized, showed:

Organic matter.....	85.36%
Mineral matter.....	14.64%

The dried powder was then subjected to systematic chemical analysis, with the following results:

<i>Chemical Analysis of Deposit in Milk Clarifiers.</i>	
	Per cent.
Protein (Nitrogen x 6.38).....	67.9
Fat.....	3.4
Milk sugar.....	7.8
Crude fiber.....	2.2
Silica.....	3.8

	Per cent.
Oxide of iron	0.5
Oxide of alumina	0.6
Calcium phosphate	3.6
Potassium phosphate	6.2
Sodium and potassium chloride	0.1
	96.1
Undetermined	3.9
	100.0

In the analysis, the silica and oxides of iron and alumina are weighed after ignition at red heat, while in the original sample they exist in hydrated form, so that the mineral matter as reported above is somewhat lower than the true amounts. The factor used for calculating the protein assumes that the nitrogen found by analysis is 15.7 per cent. of the protein molecule. If the proportion of nitrogen was less than this, then the percentage of protein stated above, 67.9 per cent., is too low. In this way, the undetermined matter is largely accounted for.

Tests indicate that the fat found in the sludge is only partly milk fat, the remainder being fat which originates from epithelial cells and other organic detritus.

The silica and oxides of iron and alumina are elements entirely foreign to milk. They are to be accounted for by the presence of earthy impurities, such as dust and sand from the soil.

The protein undoubtedly consists largely of casein, which exists in milk in combination with calcium phosphate. Not being in perfect solution, it tends to be deposited by centrifugal force. The phosphates, milk sugar, and chlorides are also normal constituents of milk.

It seems, then, that the residue in the clarifier consists very largely of substances normally present in milk. Presumably the very best product would show a similar deposit. We passed several gallons of fresh certified milk through a small clarifier, operated by hand, and obtained a thin deposit of grayish slime.

The weight of material deposited in the clarifier from 725 gallons of milk, was $2\frac{1}{2}$ pounds. As an average, then, one gallon of milk yielded 1.6 grams of moist sludge, equivalent to 0.6 grams of dried material.

CONCLUSIONS.

The clarifier completely removes from milk all coarse suspended dirt and impurities.

The material deposited in the machine contains large numbers of bacteria. It is our opinion, however, that no great percentage removal takes place, since the time during which the milk is exposed to the separating action is of very short duration; nor is there a complete deposition of all matter capable of being thrown out by centrifugal force. The seemingly greater number of bacteria in the clarified milk is due to the breaking apart of clumps of bacteria by the mechanical action.

The residue in the clarifier consists very largely of substances normally present in milk. Clean fresh milk from healthy cattle will yield a deposit when passed through the clarifier.

It is an exaggeration to consider the material deposited in the machine as consisting entirely of filth. Milk containing pathogenic organisms is prac-

tically no cleaner from the health standpoint after clarification than before. Milk depots handling large quantities of milk find that the removal of suspended matter by means of cloth or cotton filters is cumbersome and unsatisfactory. For such plants, the

clarifier is an admirable installation for the speedy and complete removal of sediment. We must not, however, consider the clarifier as in any way a remedy for faulty conditions at the source of supply, nor as a substitute for pasteurization.



MULTIPLE PROTECTION BY VACCINES.

For those visiting or residing in localities in which epidemics are present, or in countries where certain diseases are endemic and sanitary supervision is questionable, protection against a number of diseases is much to be desired. Experience with vaccines has demonstrated the possibility of conferring a degree of immunity to a considerable number of diseases. A recent report by Dr. Aldo Castellani suggests that contemporaneous protection against a number of diseases may be conferred upon an individual by the use of several vaccines at one time without any greater inconvenience than is caused ordinarily in being vaccinated to secure protection against one disease. Doctor Castellani's article was published in the report of the Advisory Committee for the Tropical Diseases Research Fund for the year 1914, recently issued. His conclusions are summarized as follows:

I. The preparation of combined vaccines is based, I think I may venture to say, on the experimental work I carried out in 1901-2 in Bonn, in Professor Kruse's Institute (*Zeit. für Hygiene*, 1902-3), when I demonstrated that in inoculating an animal with two or three species of bacteria, provided a sufficient minimum quantity was given, agglutinins and immune bodies for all the germs were elaborated, the amount of agglutinins and immune bodies elaborated for each germ being nearly the same as in animals respectively inoculated with only one species.

II. I have prepared and used in man the following vaccines:

- (1) Typhoid—paratyphoid A—paratyphoid B.
- (2) Typhoid—Malta fever.
- (3) Typhoid—paratyphoid A—paratyphoid B—Malta fever.
- (4) Typhoid—paratyphoid A—paratyphoid B—*B. asiaticus*—*B. columbensis*.
- (5) Typhoid—paratyphoid A—paratyphoid B—*B. asiaticus*—*B. columbensis*—Malta fever.

- (6) Typhoid—paratyphoid A—paratyphoid B—dysentery Kruse-Shiga—dysentery Flexner—dysentery Hys Y—dysentery Flexner-like No. 1—dysentery Flexner-like No. 2.
- (7) Cholera—plague.
- (8) Cholera—plague—typhoid—paratyphoid A—paratyphoid B.
- (9) Cholera—plague—typhoid—paratyphoid A—paratyphoid B—Malta fever.

III. The inoculation in man of the above combined vaccines is harmless. The reaction is not severe, with the exception of those containing plague germs, such as the "cholera-plague" and "cholera-plague-typhoid-paratyphoid A-paratyphoid B" vaccines, when the reaction is severe, though apparently rather less so than after Haffkine's simple plague vaccine.

IV. The combined vaccines I am now using consist of carbolized emulsions of agar cultures in normal salt solution without heating. These emulsions seem to give a less painful local reaction than broth cultures killed by heat. The presence of 0.5 per cent. carbolic acid is sufficient to kill the germs. The "typhoid-paratyphoid A-paratyphoid B" vaccine is, however, also prepared by heating broth cultures at 53.

V. The individuals inoculated with the above-mentioned combined vaccines generally produce agglutinins for each species of bacteria, and the amount for each species is not much less than control individuals inoculated with simple "one disease" vaccines. The only exception, though only to a certain extent, seems to have been in the case of typhoid dysentery vaccines.

VI. Combined vaccines, when efficient, are of practical advantage, saving a great deal of time and rendering possible a contemporaneous vaccination for several different maladies.—*Medical Officer*, London.

FUNDAMENTAL DISTINCTIONS BETWEEN LARGER AND SMALLER CITIES IN HEALTH ADMINISTRATION.

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Read before the Public Health Administration Section, American Public Health Association, Rochester, N. Y.,
September 8, 1915.

Large health departments, like large industries, are able to employ specialists to care for various details of their work. The small city health officer must often do the things that are done by a half dozen different people in the city. Doctor Park points out some of the important distinctions.

NO BETTER evidence of the great progress which has been made in the science of public health could be asked for than the fact that a paper with a topic such as the one which has been assigned me is up for consideration before so earnest-minded a body as the American Public Health Association.

It matters not how big or how little a health department may be, the ultimate result sought by every department is the same—the safeguarding of public health. While all departments, however, have this same object constantly in view, their problems of administration differ widely. Time was when the activities of the health departments of larger and smaller cities had very little in common, but in my opinion this condition has been changed and now we find a much broader spirit of coöperation and unity of purpose. Broadly speaking, then, our subject-matter may be put into one sentence in this wise: *The object sought for by every health depart-*

ment is universal, their differences in administration are local.

The one greatest distinction between the larger and smaller health department is the influence on public sentiment which the larger department has constantly labored for. This influence has not been due to the police powers bestowed upon it by law; for the little department has the same sweeping authority, even if it may not always have the means of enforcement. True, the health commissioner of the larger city is perhaps more keenly alive to his legal rights, while the smaller town health commissioner often is ignorant of his power and sometimes unable to enforce the law through lack of public sentiment. The fact is, the big department has recognized the inestimable value of publicity.

Smaller cities have been and are handicapped by lack of proper appropriations, nor do I wish to be understood in this connection as saying that the larger cities are getting a proper

per capita appropriation. I believe it to be an indisputable fact that there is not a single city getting an appropriation adequate to meet its vast needs for public health administration. But the lack of proper appropriation is more significant in the smaller cities and is largely responsible for their inability to make any rapid strides in public health work.

A great many of the advances made in the larger cities are due to their ability to specialize in every branch of activity. In the smaller cities, without a proper staff of inspectors, the health officer, or his assistants, must spend much valuable time looking up impetuous complaints on barns, chicken coops, weeds, garbage and other nuisances, which as such are matters well within the jurisdiction of the police department. The varied duties of the small town inspectors absolutely will not permit them to specialize as in the larger cities. Your small town inspector has to spend his time not only on such complaints as I have referred to, but also in attempting to score dairies, milk depots, meat markets, grocery stores, restaurants, fish markets, fruit and confectionery stores. And when he has finished these duties, requiring more or less expert knowledge, he must collect samples of milk; samples of water; he must serve notices on unsanitary conditions in business and residence districts; investigate contagious and infectious diseases; place contagious diseases in quarantine and fumigate following contagion. As often as not the small town health inspector is asked to be a sort of special constable with a vigilant eye constantly

open for law breakers and subject to call to police duty whenever a circus comes to town or at a holiday parade. With these varied duties to perform, the highest grade of efficiency and specialization are impossible.

Surface wells, vaults, cesspools and sewage, while they are problems to the larger city, are more so to the smaller one because of the limited extension of water mains and inadequate sewage systems. The smaller city's health commissioner is constantly called upon to convince stubborn property owners that the water from surface wells is not always good to drink no matter how pure it may look to the naked eye, which is about the only test that some wish to have applied.

While it has been unanimously agreed that the collection and disposal of garbage should be provided for from funds outside the appropriation of the health department, the smaller cities invariably have this burden attached to their budget. It is the stock argument of many aldermen of such cities that garbage affects the public health, and therefore is turned over to that department. The cost of garbage collection and disposal thus swells the smaller department's appropriation and often, in order to take care of it, the city fathers who preside over the destinies of the estimates of health commissioners' budgets, have to cut out items that are indispensable in actual health work. Thus, such items as estimates for laboratories, funds for bacteriological and chemical analyses, inspections, and funds for publicity work are ruthlessly slashed by the aldermanic pruning knife.

Ignorance and neglect, of course, are everywhere, but I think the smaller city's health official comes in closer contact with and has a harder battle to fight them down. There are in many American cities a certain aldermanic type who believe that when the swill has been removed and the yellow flag tacked up where the victim of contagion or infection lies dying, that the health department has performed its whole duty. This ubiquitous type of official does not realize that the important mission of the health department is to prevent disease rather than merely to flag its presence. *

Unquestionably, the milk supply is one of the larger city's problems, in the handling of which it differs from the smaller one. The larger city must necessarily have its milk transported from a greater distance than the smaller city. Hence, for the larger city, pasteurization becomes more imperative. The smaller city, because of its proximity to its source of supply, can have a more complete supervision by scoring dairies, testing cattle and by enforcing its regulations for retail and wholesale milk dealers. There is absolutely no excuse whatever for an inferior milk supply in the smaller city. Every small city should have a rigid milk ordinance.

The campaigns of publicity that have been waged year in and year out in the larger cities have helped to spread enlightenment on public health questions. Good ordinances have resulted. But the best law ever written would be worthless without intelligent public sentiment behind it, and public sentiment must be gained slowly.

Smaller cities often lose sight of this important fact. Such publicity as the little city undertakes is only too frequently lacking in human interest appeal, dramatic persistency and in policy. The lack of funds and public enlightenment is often the reason why the little city's health commissioner is unable to make a better showing. Think of all the work that may be done through the invaluable medium of publicity. For just one instance—the fact that consumption is a preventable disease and curable in its early stages, should not be said once, but must be reiterated a hundred, yes a thousand times, in order to drive it home to every citizen with sledgehammer force. With God's free given sunshine and fresh air, with an abundance of everything that the incipient consumptive needs, still thousands perish annually in our country districts.

Stubborn ignorance and neglect and greed must be considered as in the same class and along with pathological bacteria. Fight them to the last ditch. On the other hand, public interest in its work is the strongest asset any health department can have. Such interest is won by spreading the truth concerning health facts. The work which has been done along these lines in recent years in the larger cities has had a far-reaching effect, and has been the inspiration, the guiding star, for the smaller cities. What progress has been made in the science of public health must be credited to the vast publicity campaigns undertaken by the larger cities.

They have disseminated knowledge and light in places where there was only darkness; they have armored themselves with the shield of courage and truth and fought the hard fight against the mammon greed; they

have been the pioneers that have blazed the trail through the impenetrable wilderness of rank neglect. It is for the smaller city to study the ways of its bigger and stronger brother and good will come thereby.



THE DECLINING BIRTH-RATE IN ENGLAND.

Under the title of "The Declining Birth-Rate: Its Causes and Effects," the report of the National Birth-Rate Commission has been published in book form by Messrs. Chapman & Hall. The chief evidence taken by the commission is given as well as the report, the whole making a volume of 450 pages.

The report first examines the statistical information available through census returns and other sources and concludes that the following propositions are definitely established:

1. That the birth-rate has declined to the extent of approximately one-third within the last thirty-five years.

2. That this decline is not, to any important extent, due to alterations in the marriage-rate, to a rise of the mean age at marriage, or to other causes diminishing the proportion of married women of fertile age in the population.

3. That this decline, although general, has not been uniformly distributed over all sections of the community.

4. That on the whole the decline has been more marked in the more prosperous classes.

5. That the greater incidence of infant mortality upon the less prosperous classes does not reduce their effective fertility to the level of that of the wealthier classes.

The commission also consider that the following propositions, though based on less substantial evidence, are also sufficiently well established:

6. Conscious limitation of fertility is widely practised among the middle and upper classes, and there is good reason to think that, in addition to other means of limitation, the illegal induction of abortion frequently occurs among the industrial population.

7. There is no reason to believe that the higher education of women (whatever its in-

direct results upon the birth-rate may be) has any important effect in diminishing their physiological aptitude to bear children.

An additional report, signed by nearly all the members of the commission, points out one of the national dangers of restriction as it is at present practised: "The decline in the birth-rate at present is not eugenic, but dysgenic. Restriction prevails most in the classes in which the conditions of family life are most favorable, and the largest families are found under those conditions, hereditary, environmental, or both, which are most adverse to the improvement or even maintenance of the quality of the population."

So far as the decline is due to abortion, they say it is unhesitatingly to be condemned; and the use of mechanical and chemical preventives of conception injurious to health must also be censured. Some representatives of religion, however, make a reservation as regards methods not injurious to health. The signatories set out reasons why they consider an increase of the population desirable, so far as it is consistent with improvement. They point out that with more intensive culture of the land this country could satisfactorily support a larger population, and that this possibility is much extended if we take into account the whole British Empire. A number of proposals, many of them of an economic character, are also put forward for consideration as tending to further the object in view. They include a living wage, bonuses for families under certain conditions, relaxation of the income-tax arrangements, increased facilities for good education, adequate housing accommodation at reasonable rents, and measures to encourage the full development of natural resources both at home and in the Dominions beyond the seas.—*Medical Officer*, London.

SOME OBSERVATIONS ON HOMOGENIZED MILK AND CREAM.

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Read before the Laboratory Section, American Public Health Association, Rochester, N. Y., September 9, 1915.

HOMOGENIZING in the milk industry, in this country at least, has been a development of the last few years, but nearly all the large ice cream makers are already using the process. It is also used by the large creameries and milk dealers in various ways, as well as by the condensed milk factories. There are other actual, and probably many possible, applications of the principle.

For the most part homogenizing is done to secure some commercial advantage either through cheapening or improving the quality of the product, or the elimination of difficulties incident to customary methods, but there are some cases in which the process is distinctly fraudulent.

Milk and similar emulsions are homogenized by forcing them through extremely fine openings, under great pressure, with the result that the fat globules are broken up into fragments of such minute size that they are no longer capable of agglutinating together again. Hence no cream will rise to the surface of perfectly homogenized milk and no butter can be made from homogenized cream; neither can it be whipped or even separated in a mechanical separator. This practical result is in accordance with the statement of Professor Lindet of L'Institut National Agronomique, who has shown that the ascending force of fat globules in milk or cream is proportional to the cubes of their radii, and which is so feeble when the diameters are less than one or two microns that they no longer perceptibly rise in the form of cream.*

The history of homogenization is mainly French and dates back to patents taken out in 1892 for the emulsification of fats in the manufacture of oleomargarine.† Gaulin seems to have taken out the first patent for the homogenizing of milk in 1899 and his original idea

was to fix the milk in such a way as to prevent the separation of the fat and partial churning into butter during standing and transportation and handling.‡

He endeavored to do this by forcing the milk through fine capillaries; but without much success, largely because the smallest tubes he could make had a much larger diameter than the largest fat globules.

In 1902 he improved his invention by forcing the milk between two plane surfaces fitting closely together and held in position under high tension (approximately 3,000 lbs. per sq. in.). This is practically the machine as used today, although there is another also in use in which the milk is forced between steel discs clamped together on a steel core. The pressures on this machine are similar or somewhat higher.

The commercial possibilities of the process are extensive, but at present perhaps the ice cream industry is making more use of it than any other: It enables the manufacturer of this popular confection to make perfectly homogeneous mixtures out of heavy cream and either whole or skim milk, of cream and milk in which the butter has partly separated and which could ordinarily not be used for the purpose, and he can make perfectly good cream from fresh butter and skim milk or condensed skim milk, or even powdered skim milk and water. If he feels so inclined it is possible for him to use renovated or any grade of butter he chooses, oleomargarine, or any other foreign fat. All of these methods have doubtless been employed, but the use of fats other than butter has probably been very limited.

There is little literature to be found concerning the laboratory testing of homogenized products. So far as known the change produced is entirely physical. Milk and cream may be examined microscopically and, if well homogenized, the ap-

* Troude, J., *L'Homogénéisation du Lait*, Librairie Des Sciences Agricoles, Paris, 1911, p. 36.

† *Ibid.*, p. 40.

‡ *Ibid.*, p. 42.

pearance is totally different from that of natural milk. When mixed with natural milk or cream detection is not so easy in this way but would probably become certain with experience. The separate examination of the top and bottom layers of mixtures, after standing, would probably give good indications.

VonSobbe defines the degree of homogenization of milk "as the per cent. of fat remaining in the lower 50 cc. of a 250 cc. sample of homogenized milk contained in a special cylinder and after standing at room temperature, preserved with formalin, for 72 hours, as compared with a sample of unhomogenized milk similarly treated."*

Experiments are needed to show the best method of fat determination in homogenized milk. Buttenberg† gives a comparison between the estimation of fat in homogenized milk by the Adams and Gottlieb methods, in which the respective amounts obtained from two samples by the former was only 2.09 per cent. and 2.82 per cent. against 2.62 per cent. and 3.32 per cent. by the Gottlieb, although the Adams extraction was continued from 10 to 12 hours.

Among the known practices which might be classed as violations of the law, or at least deceptions, are the use of inferior or foreign fats and the artificial thickening produced by homogenization, which makes a 20 per cent. cream look like a 25 per cent. or 30 per cent. article. A trick which has been used is to separate the cream from milk, homogenize it and then return it to the milk. By so doing, the cream, not being homogenized with the rest of the milk, rises and makes a greater cream line than before. During the present year there was an official seizure of a large amount of homogenized evaporated milk with a total fat content of 6.53 per cent. which consisted of a mixture of about 17 per cent. butter fat and 83 per cent. cocoanut oil. Another, although probably legitimate practice, is to separate milk when the supply is abundant, store the cream or butter made from it until milk is scarce, and then homogenize it with skim milk, or skim milk powder made from the original milk.

Just what attitude public health officials should take toward homogenized products

might depend on circumstances; but it would seem as though there should be no general objection unless an unhealthful product is made or one which would tend to deceive the consumer.

With the exception of the occasional fraudulent use of the process, homogenization apparently marks a distinct advance and the product thus made seems to be of better flavor and texture than unhomogenized cream containing the same amount of fat. Another feature of distinct advantage to the public in homogenized products is that they are practically all pasteurized.

A serious difficulty in the manufacture of evaporated milk is the occasional partial separation of the butter fat. Homogenization prevents this and also permits the canning of natural sterilized milk, as the cream does not separate and the contents of the can remain in a uniform fluid condition.

One novel and apparently highly important use found for the homogenizer is the preparation of modified milk for infant feeding. Ladd has made feeding experiments on cases of fat intolerance in infants, with very promising results, by replacing butter fat with olive oil.‡ The same author has in a later paper suggested cod liver oil, soja bean oil, etc., sometimes in malt soup mixtures, and in various combinations.§

There is recent information that at least one large milk company is now experimenting with the idea of making a modified milk commercially in which cocoanut oil is substituted for butter fat for medical reasons.

It might be mentioned in passing, that there have also appeared on the market machines called emulsors which emulsify cream products in such a way that the fat is not broken up so much as to prevent the cream and butter again being separated.

Two sets of measurements were made of the fat globules in samples of homogenized cream from two different machines working under pressures of from 700 to 4,000 pounds per square inch. In general, the degree of homogenization is increased with the pressure and in one of the machines the destruction of the fat globules

‡ Ladd, Maynard, M. D., *Archives of Pediatrics*, June, 1915.

§ Homogenized Milk. Its Possible Application to Infant Feeding. *Boston Medical and Surgical Journal*, July 1, 1915.

* *Chemical Abstracts*, Vol. 9, No. 10, p. 1352.

† Troude, J., *L'Homogénéisation du Lait*. Librairie Des Sciences Agricoles, Paris, 1911, p. 28.

was so great that most of them lost their spherical form and appeared like a fine amorphous precipitate when seen through a one-twelfth-inch oil immersion objective. The diameter of the majority of the natural fat globules in milk

is between .005 and .006 of a millimeter and that of most of the homogenized globules between .001 and .002 of a millimeter.

These results are shown and compared in the following table:

RELATIVE NUMBER OF FAT GLOBULES OF VARIOUS SIZES IN NATURAL CREAM AND CREAM HOMOGENIZED UNDER THE PRESSURES PER SQUARE INCH INDICATED BELOW.

Diameters in millimeters.								
	.009-.007.	.007-.006.	.006-.005.	.005-.004.	.004-.003.	.003-.002.	.002-.001.	.001-.0005.
Natural cream.....	few	many	most	few	few	v. few		
Homogenized cream								
Machine No. 1.								
1,000 lbs.....			v. few	few	many	many	most	v. few
2,000 lbs.....				v. few	few	many	most	v. few
4,000 lbs.....					few	many	most	v. few
Machine No. 2								
700 lbs.....				v. few	many	many	most	v. few
2,000 lbs.....							many	mostly granular
3,500 lbs.....					v. few	few	many	mostly granular



Normal Milk 1000 Diameters.



* Homogenized Milk 1000 Diameters.

*Lack of sharpness due to active brownian movement.

ACCURACY OF DIAGNOSIS OF MUNICIPAL HEALTH CONDITIONS BASED UPON VITAL STATISTICAL DATA.

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Read before the Public Health Administration Section, American Public Health Association, Rochester, N. Y.,
September 10, 1915.

WITHOUT vital statistical data there can be no accurate diagnosis of municipal health conditions, any more than there can be a diagnosis without a patient.

The principal functions of a municipal health department are not only to compile statistics for future use, but to render them useful for the present—in fact, to employ them in the control of sickness and death. Everybody is vitally interested in the present, especially how to keep well or how to get well, and while many may be willing to cope with future conditions when they meet them, yet “Safety First” was always an instinct, long before it became a slogan.

In order to obtain an accurate picture of the health conditions of any municipality a complete record must be kept of morbidity and mortality statistics. As these two branches of public service are coördinate they should be under one administration, instead of being separated as they frequently are.

Mortality statistics without morbidity records would be similar to a one-sided bookkeeping. Vital statistics, therefore, in its broadest sense,

forms the municipal health bookkeeping. To be of practical use it must be:

1. Accurate.
2. Complete; containing assets and liabilities, in other words, morbidity, mortality, births and marriages.
3. Available to the public.

Accuracy.—Nothing is more detrimental to any health department than to have its records questioned, but to obtain accurate records there must be coöperation between the health department, the physician, and the public. Without such coöperation no department can do efficient work and all its efforts will become nil.

Every community prides itself upon its health conditions. Unfortunately some communities, in their anxiety to outdo others, stretch this pride to a point where it becomes a common focus for suspicion.

Accuracy of diagnosis and dependability on what is presented form the mainspring of all municipal health work.

The registrar is the community's diagnostician, but he in turn must depend upon the practising physician for the reliability of his information. It therefore behooves the registrar to

not only record and tabulate the information presented, but also to keep such close scrutiny and supervision of conditions that the physician is bound to present them as accurate as it is possible to do.

Such close relationship will result in complete morbidity and mortality reports; will discover epidemics before they have impressed themselves upon the public with the seal of death; will eliminate the source and root out the evil.

Completeness.—To control disease—and to a great extent also death—the health department must know when and where disease exists, must study its cause, adopt proper methods to eliminate it, and guard against future repetition.

To obtain such results—now no longer considered ideal—the physician must make proper reports to the health department not only of notifiable diseases but of every disease with which the public is concerned.

By tact, good judgment, and the occasional aid of the courts, many health departments are gradually climbing towards the ideal in public health administration. Their success is a stimulant and incentive to others; while still another, and by no means small majority, blindly adopt whatever presents the seal of common approval.

Available for Public Use.—While “health” has always been considered “wealth,” yet it is strange that man will fight for the one while totally

disregarding the other. It, therefore, becomes the function of a health department not only to be the guardian of the community's health but virtually to bring health to the individual and see that he uses it, as a nurse would give a patient the prescribed medicine.

Judicious publicity, methodically and attractively presented, is universally conceded to be the best means for accomplishing such results. By employing graphic methods the public will quickly comprehend what it is intended to present as well as what is desired to be accomplished. If the department issues such information or instruction as experience has shown advisable, the public will respond. Unintelligible data, no matter how scientifically accurate or important, is a waste of energy. Short, pointed, sledge-hammer blows, which clearly describe existing conditions, will give more immediate results.

While weekly, monthly and annual publications are a necessity, yet it is well to make liberal use of the daily press. People will read in the papers what they might never see in department publications. All such departmental issues should bear the stamp of authority.

Public lectures, especially with the aid of stereopticon slides or motion pictures, are of greatest value. While entertaining the public, old and young will more easily understand what they hear by also seeing it, and the impressions thus made will be permanent.

WATER CHLORINATION EXPERIENCES AT TORONTO, CANADA.

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Read before the Laboratory Section, American Public Health Association, Rochester, N. Y., September 7, 1915.

THE purpose of this paper is to present briefly certain experiences at Toronto, particularly in connection with the chlorination of the water supply. At Toronto all matters having to do with the purification of the city water are in charge of the Laboratory Division of the Department of Public Health. It has, therefore, come about that we have been able to study certain problems from both a laboratory and from an operating standpoint.

As chlorination of water supplies has become more general it has, we think, come to be recognized that different waters vary a great deal in respect to the ease with which they can be chlorinated efficiently without the production of objectionable tastes or odors. In the case of some waters the dose necessary to produce an objectionable odor or taste is two, or three, or more times the dose that is necessary for bacterial destruction. Such a water is obviously easy to treat. We call waters of this kind "wide gap waters," meaning that a wide gap exists between the efficiency dose and the taste dose. A second class of waters presents a comparatively narrow gap, that is to say the dose of chlorine necessary for bacterial destruction is never very far below the dose that will give a taste. It seems possible that there is a third type of water in which the taste dose is below the efficiency dose, which means that it would be impossible to chlorinate this water effectively without having an objectionable taste or odor present all the time. We have had no experience with such a water, but can conceive the possibility of its existence.

At Toronto our water supply is drawn from Lake Ontario, and it belongs to that class of water presenting at all times a comparatively narrow gap between the efficiency and the taste doses. At Toronto the interesting point is that the gap between the efficiency and the

taste doses is by no means of constant width. Under certain conditions it narrows, that is to say the taste dose and the efficiency dose move closer together, in fact we believe at times they practically coincide.

It will be understood from the foregoing that the water which we have to chlorinate is variable, that is to say we will for a period of days get a water at our intake pipes which it is possible to chlorinate efficiently without taste with considerable ease. Then in a few hours the water may change in character to a water that it is very difficult to chlorinate efficiently without getting complaints from the citizens that the water tastes and smells. We call this troublesome type of water "a susceptible water," meaning that it is susceptible to taste or smell after chlorination. At Toronto the variability of the water at the intake with respect to the ease with which it can be chlorinated satisfactorily is entirely dependent upon winds. If we have steady west winds, or north winds, or south winds—the latter being a rarity—we have no particular trouble in chlorinating the city water, but when we get a sustained east wind then we have trouble. Just why this should be we admit frankly we do not know. Color would appear to have nothing to do with the matter. We are sure also that turbidity is not a factor, and we are sure also that temperature is at least not the whole story. Our sewage disposal works discharge into Lake Ontario five miles east of the water intake, and there is no doubt that with an east wind we get some, often serious, sewage pollution. Susceptibility to taste, however, of an east wind water does not seem to vary at all uniformly with the degree of sewage pollution as determined either by bacteriological or chemical examination. Nevertheless, we consider it a decided possibility that taste after chlorination of an east wind

water is due to the formation of chlor-amines or similar substances.

Another feature of an east wind water that deserves mention is that on microscopical examination it shows the presence of an unusually large number of microscopic organisms. While some of them are of the taste and odor variety we are not able from our examinations to say definitely that the presence of these organisms makes our east wind water chlorine susceptible, although we consider that a distinct possibility.

It will be plain from what has already been stated that in Toronto it is not possible for us to add the same dose of chlorine to the city water day after day, and get efficiency in bacterial destruction, and not get taste. It is necessary for us to vary the dose fairly frequently, probably half a dozen times a week on an average, and to do this satisfactorily we were compelled to devise some reliable method for our guidance. This will be dealt with presently.

A few years ago it was not infrequently stated that if a dose of chlorine sufficient to sterilize water were used the sterilizing action was instantaneous, and the chlorine rapidly disappeared. With Great Lakes water at Toronto, at least, this is not a fact. It is our opinion that in order to be sure that bacterial destruction has been accomplished it is necessary to add to the water enough chlorine to leave a slight surplus present for at least several minutes, this surplus being recognized by the blue color given by the ordinary starch-iodide test. With our system of dose control we endeavor to keep this slight excess of chlorine a constant quantity regardless of the nature of the water that is under treatment, and regardless of the dose that has to be added in order to maintain that excess. Our procedure is as follows: We have had made up a cabinet arrangement which gives constant light conditions, and this cabinet contains a set of blue color standards made up with aniline dyes and also three burettes containing dilute sulphuric acid, potassium iodide, and freshly prepared starch. Our chlorination operators take samples of water about three minutes after chlorination has occurred, and add definite quantities of acid, starch, and potassium iodide. A blue color results, and this blue color is matched up against the set of standards.

The set of standards we use number 1 to 5, No. 1 being the lightest and No. 5 the darkest. Our instructions to our chlorination operators are to "Keep color No. 2." They follow out these instructions in this way. They make their tests of the chlorinated water every hour, and if the color drops to color No. 1 the dose of chlorine being added to the water is raised a notch, and after a proper period of time another test is run to see whether with the new dose there is a sufficient surplus of chlorine to give color No. 2 on the standards. If, on the other hand, the starch-iodide color in the chlorinated water should rise to color No. 3, the dose would be cut down a notch and checked up as before.

By conducting a series of tests we determined that color No. 2 represented a surplus of chlorine in the finished water that would guarantee us efficiency in bacterial destruction at all times, and in the great majority of cases would not give taste or odor, and under no circumstances a bad taste or odor. Following this method of dose determination we have at trouble periods, when the character of the raw water is changing pretty rapidly, been able over so short a period as 12 hours to cut the dose of chlorine all the way from .3 parts per million to .175 parts per million, and get efficiency and absence of bad taste throughout. Without some system of this kind of determining rapidly the dose of chlorine required at the moment, there is no doubt in our minds that we would either have lost our efficiency, or we would have had numerous complaints from the citizens about the taste in the water.

We had considerable difficulty in producing with aniline dyes a set of blue colors that really matched closely the starch-iodide color in chlorinated water at Toronto. We tried a great many dyes by themselves and in combination, and finally enlisted the assistance of an artist familiar with mixing colors. It was found in the end that by mixing a cardinal with a green we were able to get a very good match. Moreover, this combination for some reason or other gives the standard a somewhat opalescent appearance instead of being perfectly bright, and this improves the standard because the starch-iodide color is not bright on account of the presence of gelatinized starch.

It is interesting to note here that the blue color given with starch and iodine by a chlori-

nated non-susceptible water is not usually the same as that given by a susceptible chlorinated water, the latter giving a blue with more green in it.

The exact method of preparation of the aniline dye standards is as follows:

The dyes are manufactured by Read, Holliday, & Sons, 11 Gold St., New York City; and they are sold under the trade names of Brilliant Mill Green "S" and Cardinal Red "J."

Standard No.	Distilled water.	.01 Per Cent. Brilliant Mill Green "S."	.01 Per Cent. Cardinal Red "J."
1.	150 cc.	4 cc.	.866 cc.
2.	150 cc.	5 cc.	1.053 cc.
3.	150 cc.	6 cc.	1.10 cc.
4.	150 cc.	7 cc.	1.15 cc.
5.	150 cc.	8 cc.	1.25 cc.

It will be noted that there is proportionately less red in the higher colors.

We do not know how long these standards will keep. We make up fresh ones every week, but it is quite possible that they would remain in good shape for a longer period than this.

As to the results to be expected by this method of control we would say that at Toronto we appear to have a water that is decidedly troublesome to chlorinate efficiently, and yet avoid taste. We have had this method of control in operation for a period of four months, and we have practically never failed to get efficiency in bacterial destruction, and complaints of taste in the city water have been comparatively rare.

It may be of interest to note that we have tried out liquid chlorine fairly extensively at Toronto, and our conclusion is that at least

with Great Lakes water at Toronto it possesses no advantages over chlorine derived from bleaching powder as far as lower dose and freedom from taste are concerned.

In conclusion the writer desires to state that while he has had some part in developing the system of dose control outlined in this paper, it has in a large part been the work of Mr. J. W. Scott, who is a member of the Laboratory staff, and who has direct charge of our chlorinating plants; and of Col. G. G. Nasmith, the Director of the Laboratories.

In connection with this paper the reduction in the typhoid death-rate at Toronto in recent years is interesting.

DEATH-RATE FROM TYPHOID FEVER PER 100,000 OF POPULATION IN TORONTO, CANADA.

(All deaths from typhoid fever included whether of outside or inside origin.)

1910.	40.8
1911.	20.0
1912.	12.1
1913.	10.4
1914.	7.5
1915.	1.9

The greatest factor in the reduction shown above is believed to be chlorination of the city water supply, controlled in such a way as to be efficient at all times. It is true that in the period shown there has gone into commission at Toronto an efficient slow sand filter, but this cannot have been the big factor as shown by the following schedule showing the proportion of the water supply filtered at various times.

1910 and 1911—no water filtered.

Jan. 2, 1912—July 5, 1912, all water filtered.

July 5, 1912—Sept. 1, 1912, no water filtered.

Sept. 1, 1912—Apr. 1, 1913, 75 per cent. of water filtered.

Apr. 1913 to end of 1915, 40 to 50 per cent. of water filtered.

EFFICIENCY IN THE WORKER, AND ITS MAINTENANCE.

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Read before the Industrial Hygiene Section, American Public Health Association, Rochester, N. Y.,
September 7, 1915.

BY EFFICIENCY, only physical efficiency will be understood in this paper. Physical efficiency can best be obtained by the medical supervision of factory employees. This involves the factory's maintenance of a special medical department which shall be directly under the superintendence of the Board of Directors of the plant. The head of the department should be a doctor who shall have as assistants other doctors and a corps of thoroughly trained nurses—the number of doctors and nurses depending on the size of the plant. For a shop of two thousand employees, one doctor, with a competent male nurse and a stenographer to handle the records, is sufficient.

The medical department requires for its operation a hospital room or building which will be so equipped as to enable a department to make physical examinations, and to care for all accidents and to treat all cases of minor sickness. The best method of handling the physical examinations is to make two examinations, at least, on every employee. The first examination should be a preliminary examination made by the nurses, who, however, should have received special instructions from the doctor as to the methods of making the examinations. These examinations should be made before the employee is hired and should consist of a notation of the employee's general appearance, careful examination of the eyes and ears, position of the apex, beat of the heart, inguinal regions, whether hernia is present or not, and the extremities, and for conditions which would affect the work of the man in the department to which he would be assigned. The nurse should also note carefully any signs of possible contagious disease. If everything is normal, the man's hiring slip should be O. K'd for the

preliminary examination and the man becomes employed in the shop. If any part of his body examined shows a defect the man should be held until the doctor arrives, for the doctor's approval before the slip is passed through.

Contagious diseases should always be a bar to employment. Other defects should bar from various departments depending upon the defect and the work expected of the employee.

Between two and three weeks after the preliminary examination, the employee should receive a complete physical examination by the doctor. This examination is to ascertain the exact physical condition of the employee and to advise him as to how to keep in the best physical condition. The examination should be as complete as in life insurance. Blood pressure should be taken of all employees over 20 years of age and a urinalysis done in all cases over 40, and in all cases having a blood pressure over 150 systolic. At the time of the examination the employee should receive private instructions given by the doctor—printed information as to how to keep well and what to do in case of minor accidents. Physical examinations also introduce the man to the hospital and to the hospital staff so that he knows where to come in case of sickness or accident.

Examinations should be made with the same privacy as obtained in the doctor's private office. All accidents or sickness occurring in the shop should be sent immediately to the hospital for diagnosis and, in minor cases, treatment. A shop hospital should not attempt to be a dispensary but rather a diagnostic clearing house. Cases not in need of a doctor should receive the simple treatment indicated. Those who are really sick should be instructed to see their family physicians or report at the city

hospital. Men who are out sick and return to work should be obliged to come to the hospital before resuming their work in order that the department may know definitely that they have no contagious disease, and that they have completely recovered and are able to resume work.

Where it is possible, it is advisable to have a follow-up system by which all men absent from work for more than forty-eight hours are looked up in their homes and the causes of their absence ascertained. All accidents should come at once to the hospital for treatment and should not be treated by first aid men except in plants where the hospital is too far to warrant the time to go to it for very minor injuries.

In each department the foreman should be instructed in first aid for the more serious accidents and each foreman should be able to perform artificial respiration by the Shaffer

method. Each department should also have a first aid kit applicable only for severe injuries in order that prompt attention may be given to hemorrhages, unconsciousness, fracture, etc., before the man is taken to the hospital.

The medical department should supervise sanitation throughout the shop and have in its control as many employees as are necessary to maintain sanitation and perfect conditions.

The medical department should also publish monthly literature to be distributed in leaflet form in the pay envelopes, describing in simple language the more common sicknesses and accidents and the best methods of their prevention. Medical treatment should not be taken up in these bulletins.

Such a department will, undoubtedly, increase the physical efficiency of the worker and will reduce the loss of time from sickness and accident very materially in the factory.



THE NATIONAL BOARD OF MEDICAL EXAMINERS OF THE UNITED STATES.

The need of a standard medical examining body for the whole United States and its Territories (tributary thereto) has occasioned the organization of the National Board of Medical Examiners. It is a voluntary board, the members of which are selected from the Medical Corps of the Army, the Navy, and the Public Health Service, the Federation of State Examining Boards, and other representative organizations, and the medical profession of the United States.

The aim of this board is to establish a standard of examination and certification of graduates in medicine, through which by the coöperation of the individual Boards of Medical Examiners, the recipients of the certificates of the National Board of Medical Examiners may be recognized for licensure to practice medicine.

The policy of the board is to conduct its examinations on a broad scientific basis of such a high yet practicable standard that the holders of its certificates will receive universal recognition.

The independent action by the board is furthered by the financial and moral support of the Carnegie Foundation.

The permanent organization of the board will consist of the three surgeon-generals and one other representative from each of the Government Medical Services, three representatives of

the Federation of State Medical Examining Boards, and six members chosen at large from the medical profession by the National Board of Medical Examiners.

REQUIREMENTS.

Requirements for Admission to the Examination.
Satisfactory completion of

- (a) *High School.* A four-year high school course.
- (b) *College.* Two years of acceptable college work, including physics, chemistry, biology, and a modern language.
- (c) *Medical School.* Graduation from a Class "A" medical school. (American Medical Association classification.)
- (d) *Hospital Training.* One year as interne in an acceptable hospital or laboratory.

It is expected that the examination will cover about one week.

No fee is charged for the examination itself, but a registration fee of \$5 will be required.

The first examination will be held in Washington, beginning October 16, 1916.

Further information and application blanks may be obtained from the secretary, Dr. J. S. Rodman, 2106 Walnut Street, Philadelphia, Pa.

REPORT OF COMMITTEE ON WORKS OPERATION AND ANALYTICAL METHODS.

LEWIS I. BIRDSALL, F. E. DANIELS, C. A. EMERSON, JR., C. B. HOOVER,
H. C. McRAE, RICHARD MESSER, W. L. STEVENSON, *Chairman*.

Read before the Sanitary Engineering Section, American Public Health Association, Rochester, N. Y.,
September 9, 1915.

ANALYTICAL TESTS.

THE 1914 Progress Report of the Committee recommended the tests shown in the attached diagram as the most useful for operating control and for determining the efficiency and sufficiency of the treatment of sewage. During the past year there has been no adverse criticism of these tests, nor have any others been suggested.

Your Committee therefore desires to reaffirm the advisability of the use of these tests as far as possible in all laboratories connected with the operation of sewage treatment works, for, in addition to their usefulness, general adoption would make possible comparison of results of operation from published reports.

This does not mean that other tests should necessarily be abandoned, for that would interfere with comparisons between past and present results of operation, which would be disadvantageous for local purposes.

IMPORTANCE OF EXPERT OPERATION.

The volume of sewage in America which must be taken care of is increasing rapidly each year. This is attributed to the natural growth of cities and towns, and is also due to the general

demand for complete sewerage facilities throughout the country, which requires the installation of new sewer systems and the extension of existing ones. These conditions add steadily increasing loads upon the water courses while their ability to receive the sewage does not increase and in some cases actually decreases; consequently, the pollution of water courses is becoming more evident and in many instances has gone beyond safe limits.

The continued increase of urban population throughout the country compels the municipalities to depend for the most part upon the large surface streams for sources of water supply. Certain pathogenic bacteria contained in sewage, notably those causing typhoid fever and certain forms of dysentery, are capable of surviving for considerable periods in water, and even after being transported for many miles by stream, may produce disease if again taken into the human system.

The people at large are waking up to the importance of maintaining our rivers and streams in a reasonably clean condition, so that they may serve as proper sources of water supply and be useful for both industrial and pleasure purposes. To conserve these natural advantages sewage treatment

works are being constructed all over the country and these in the aggregate represent the investment of large sums of money.

It is therefore surprising to learn how few sewage works in America are under competent supervision and provided with laboratory facilities, in fact only a few of the larger plants receive such attention.

In the case of water purification plants, the public in general demands that the works shall be operated with skill and that the product delivered to the consumer shall be the best that can be obtained with the available facilities. This is only natural, as a deterioration in quality, even though it be for only a short period, is apt to have a direct and deleterious effect on the health of the community. On the other hand, inefficient or careless operation of sewage treatment works does not, as a rule, give rise to a storm of protest, unless the error is so great that it is apparent to the most casual observer.

One of the reasons for this lack of interest on the part of the public is that in many cases sewage treatment works are installed for the good of the commonwealth and the citizens of the town do not personally realize the resulting benefits. Another reason lies in the fact that sewage works are frequently objectionable and untidy; this is due to the lack of appropriation of sufficient funds for maintenance, and sometimes to carelessness.

With modern processes and proper operation it is possible to reduce objectionable sights and odors to such a point that only a prejudiced visitor

will be dissatisfied. A reasonable amount of money spent in laying out flower beds, shrubbery, and trees, and in taking care of the grass and walks will be more than returned in the added interest in the plant by its operators and by the citizens.

Your Committee begs to call the attention of designing engineers to the importance of including the sodding or seeding of slopes and planting of trees and shrubs in the contracts for the construction of sewage treatment works, for new works are too often left in a very unsightly condition with respect to landscape embellishments.

Municipalities frequently employ expert engineers to study local conditions and to design sewage treatment works, but when such works are put in service their operation is intrusted to an untrained employee, transferred from some other branch of the service, who is totally lacking in knowledge of the complex forces which must be controlled in order to produce the results which the designers intended and for which the funds were invested.

This is poor business policy; a municipality or private owner would not attempt to operate a power plant or other installation involving complicated machinery without the services of trained engineers because they know it would not be economical to do so.

NEED FOR LABORATORY CONTROL.

Where sewage treatment works are of sufficient size to warrant it, laboratory control will allow improvements in methods of operation whereby failures may be averted and the capacity

of the plant maintained to an extent which will more than pay for the small expense involved.

In the case of a small works the expense of an individual laboratory will usually be prohibitive. However, if there are several such plants in the same neighborhood, it may be possible to obtain the services of an expert operator, provided with a laboratory, to look after all of them, and the expense divided among the several communities would be very small. It is recommended that designing engineers call the attention of their clients to the necessity and economy of such operating control.

CENTRAL AUTHORITY ADVISABLE.

As the great majority of sewage treatment works in America are small and frequently widely separated, it is apparent that the needed expert supervision cannot be obtained locally and that efficiency of operation can only be obtained through some central authority.

In several states, the legislatures have empowered the state boards of health with authority to control the pollution of water courses, and their approval is required before sewerage works can be constructed.

The State Board of Health, in its uniform relation to all the municipalities of the state and with similar boards in adjacent states, is in a position to perform such a service to better advantage than any other body now existent in the usual organization of the various state governments of the country. The problem is not for the national government, as the operation

of sewage treatment works requires oversight by individuals familiar with local needs, characteristics and possibilities, and stationed within a few hours' travel of the local works, in order to be of service in case of emergencies which require immediate attention or advice. On the other hand, except in scattered cases, the unit of the county appears to be too small.

In municipalities where sewage treatment is intrusted to competent, expert employees and where this work has the strong, moral and financial support of the citizens, the exercise of state authority and supervision is but little needed. But in such cases the coöperation of state and municipal officials is of mutual advantage.

For the state boards of health to act intelligently they should know the methods of operation and results accomplished in all the sewage treatment works in the state. They would then be able to act as clearing houses, applying to one works the information obtained from several others operating under similar conditions. Such information must, of course, be applied to any particular works by one who is thoroughly conversant with local conditions and able to distinguish the peculiarities and differences involved. The operation of each works is a purely individual matter. Blindly copying, without due analysis of the local conditions, is generally fatal.

This would in no way encroach upon the province of the private or consulting engineer; on the contrary, it would be to his advantage.

The state is interested in seeing that the existing works accomplish the best

results possible and the separate communities are naturally anxious that the works shall meet the requirements at the minimum expense for operation, additions and renewals.

DATA REQUIRED.

To obtain these data, information is required on the following:

1. The purpose of the works, *i. e.*, are they primarily intended to protect sources of water supplies or to prevent the creation of nuisance.

2. The construction of the works, *i. e.*, the details of each process which influence operating methods, rather than the stability of the structure.

3. The quantity and character of the sewage to be treated.

4. The methods of operation and results accomplished.

The data concerning the construction of the works should be obtained by the State Board of Health, either through plans submitted for approval supplemented by record plans after the works are constructed, or, in cases where the Board is not yet clothed with such authority, by means of inspection and measurement. Any changes from the original contract drawings or alterations after the plant is in service should be especially noted, as these may be vital information in connection with operating policies.

It is presumed that in those states where the law does not require approval of sewerage works before construction, the number of plants is small and hence there should be no difficulty in obtaining the needed data.

The records of operation and results accomplished should be furnished the state by the town or owner upon blank forms prepared by the town officials or the owner in conjunction with the state officials.

REPORT FORMS.

It is practically impossible to recommend a standard form of report blank to cover all the many types of apparatus used in sewage treatment. If, however, the report form for each works in a state is prepared to meet the local needs, it can still contain essential data so recorded that reports of operation of similar types of apparatus in different works will be in identical form for comparison.

In preparing such forms, it should be borne in mind that the small works are generally operated by employees lacking a technical education and therefore clearness and simplicity should be obtained by having as much as possible printed, leaving only figures to be filled in.

The reports should be printed on sheets either $8\frac{1}{2}'' \times 11''$ or of such size as to conveniently be folded to $8\frac{1}{2}'' \times 11''$, so as to facilitate filing in standard letter files. It would be desirable to have the sheets made up in the form of pads, so that the operator by placing carbon paper beneath the top sheet could obtain a copy.

The record sheets should be signed by the operator and mailed at monthly intervals to the office of the State Board of Health.

TESTS FOR DETERMINING THE COMPOSITION OF CRUDE SEWAGE FOR COMPARISON.

OCCASIONAL COMPOSITE SAMPLES TO BE ANALYZED FOR NITROGEN AS ORGANIC AND AS FREE AMMONIA—TEST FOR SUSPENDED MATTER CALLED *Y* IN REPORT AND CHLORINE AT SAME TIME SAMPLES TO BE EXAMINED FOR AVIDITY FOR OXYGEN TEST CALLED *X* IN REPORT.

FOR SEWAGE TREATMENT WORKS PRIMARILY DESIGNED TO PREVENT NUISANCE.

Type of works	Tests for operating control and determination of efficiency				Tests to determine sufficiency of treatment
	Influent and effluent of preliminary processes	Sludge drawn from		Effluent of oxidation process	Receiving body of water
		One story tanks	Two story tanks		
Works consisting of preliminary processes only such as fine screens or sedimentation	(1) Test for the avidity for oxygen called <i>X</i> in text	(1) Specific gravity (2) Percentage moisture in wet sludge (3) Percentage of dry residue that is volatile			(1) Test for avidity for oxygen called <i>X</i> in text (2) Test for suspended matter called <i>Y</i> in text (1) Dissolved oxygen
Works consisting of preliminary and oxidation processes such as contact beds or percolating filters	(2) Test for suspended matter called <i>Y</i> in text	(4) Reaction of wet sludge		(1) Nitrogen as nitrates (2) Test for the avidity for oxygen called <i>X</i> in text (3) Dissolved oxygen (4) Relative stability*	(1) Test for avidity for oxygen called <i>X</i> in text (2) Nitrogen as nitrates (3) Dissolved oxygen (4) Test for suspended matter called <i>Y</i> in text (5) Relative stability* (2) Test for avidity for oxygen called <i>X</i> in text

FOR SEWAGE TREATMENT WORKS PRIMARILY DESIGNED TO PROTECT SOURCES OF WATER SUPPLY.

Works consisting of preliminary processes and disinfection		(1) Specific gravity (2) Percentage moisture in wet sludge (3) Percentage of dry residue that is volatile		(1) Presumptive test for <i>B. coli</i> (2) Test for avidity for oxygen called <i>X</i> in text (3) Test for suspended matter called <i>Y</i> in text	(1) Presumptive test for <i>B. coli</i> (2) Dissolved oxygen
Works consisting of preliminary and oxidation processes and disinfection	(1) Test for the avidity for oxygen called <i>X</i> in text (2) Test for suspended matter called <i>Y</i> in text	(4) Reaction of wet sludge		(1) Nitrogen as nitrates (2) Test for avidity for oxygen called <i>X</i> in text (3) Dissolved oxygen (4) Relative stability*	(1) Presumptive test for <i>B. coli</i> (2) Test for avidity for oxygen called <i>X</i> in text (3) Nitrogen as nitrates (4) Test for suspended matter called <i>Y</i> in text (5) Relative stability* (6) Dissolved oxygen (3) Test for avidity for oxygen called <i>X</i> in text

* In small plants not provided with a laboratory relative stability may take first place.

It is again desired to call attention to the importance of recording essential data. In the majority of sewage treatment works no provision is made to obtain a record of the rate of flow to the plant even though such information is vital to proper operation. The Committee strongly recommends that engineers in designing new works provide means for easy measurement of the flow and that measuring devices be installed in existing works not now so equipped.

When the record forms are printed, blank spaces should be left at convenient places where it may be desired to put figures resulting from computations by the state authorities.

For example, if the operator reports that sludge was placed on drying bed "D" to a depth of 7 inches, the state official, knowing from the records the area of the bed, can compute the number of cubic yards of sludge, which he would enter in the blank space mentioned.

RESULTS WHICH CAN BE OBTAINED BY ADOPTING THESE RECOMMENDATIONS.

If this system of obtaining data were to be put in force, in a short time the state officials would be in possession of a fund of information which could be used in advising operators of sewage works and this would not only aid the local communities but also the commonwealth.

When sewage works are operated without producing nuisance and at a reasonable expense, the objection on the part of communities to being compelled to install works will diminish, for the fear of failure will be lessened.

It would be of further advantage if the state boards of health would use the information so gathered to prepare pamphlets written in clear, popular style, to call to the attention of town officials the need for, and value of, sewage treatment not only as a local matter but in its broader effect upon the commonwealth.

◆ THE PROGRESS OF CIVILIZATION.

In the earliest history of the race nobody cared for babies, except, perhaps, their mothers.

Babies had no rights; they were only a necessary evil—and the records of the slow progress of civilization might be written in the blood of babies.

In the South Sea Islands, when either parent died, the children were slain and buried that they might wait on the parent in the other world.

In China, girl babies in the interior provinces were drowned or thrown in towers to perish.

In parts of India the mother put opium on her breasts that the baby might take it with the milk and die.

Even the Greeks, who established a civilization higher than that of any other ancient people, exposed their undesired infants on the mountain tops.

But little by little, through the succeeding centuries, the baby has been coming into its own, until today the infant death-rate is considered the best index to a civilization.

By the same standard may be measured the civilization and the evolution of the individual.

What babies' lives are made they will be. Through them and their descendants influences for good or for evil are perpetuated to the end of time.

According to these influences the greatest empires have arisen and fallen, the most powerful dynasties have come and gone.

America can not hope to escape the great law of causation.

In a million years, when the forests are felled and the streams are dried and when the desert prevails, will it become a field for the surveying parties of the archaeologist hunting for relics of a well-nigh forgotten people?

Will all that remains of America be the ruins of another civilization? Or will her character and her influence endure as a priceless heritage to a greater and a nobler race?

The answer will be written in the care that is bestowed on the babies.—*Bulletin of Kansas State Board of Health.*

REPORT OF THE COMMITTEE ON HABIT-FORMING DRUGS.

To the President and Members of the American Public Health Association

GENTLEMEN:

Your Standing Committee on Habit-Forming Drugs, recognizing the importance of the subject intrusted to its charge and the need of its careful consideration, have requested certain persons to serve as an Advisory Committee and those whose names are given below have consented to render this service.

We deem it our duty to give utterance to our recognition of the able and conscientious work of the United States Commissioner of Internal Revenue, the Hon. W. H. Osborne, and desire to pledge him our assistance whenever possible. We also desire to acknowledge the efforts of those members of the medical and pharmaceutical professions who have aided in the passage and enforcement of the Federal Anti-Narcotic Law known as the Harrison Act.

In connection with the problem of narcotism in this country, its importance to our people and its relation to the Harrison Act, we desire to make certain recommendations. These we have divided into two classes: First, those dealing with the operation of the Federal Law; Second, those dealing with the problem in general as related to other constituted authorities and to the public.

(1) We recommend as essential to the better solution of this problem, that Section 6 of the Harrison Act be repealed.

(2) That physicians and druggists who may, from time to time, be shown to be habitual users of narcotic drugs be denied the privilege of registration as dealers and dispensers of these drugs.

(3) That upon a second conviction for violation of the act revocation of the registry number of the violator together with denial of future privilege to register be made a part of the penalty.

(4) That an increase be made in the number of special agents delegated with the enforcement of this act, in order that the territory of each agent be reduced in area.

(5) That a census be made of all habitual users of narcotic drugs.

(6) That the Collectors of Internal Revenue of the various districts be instructed to require, from all dealers in these drugs, an accounting of all purchases and disbursements every ninety days and further that, in each district, these returns be published in the daily papers.

(7) That, wherever possible, the collectors in the several districts and their agents coöperate with the local authorities for the suppression of narcotism.

Under the second heading your committee would recommend the following:

(1) That the proper authorities in the several states of the union undertake the establishment of custodial institutions together with provisions for commitment for noncriminal drug users, and that the authorities of the penal institutions of the several states be urged to undertake the segregation and treatment of inmates who are habitual users.

(2) That in state or municipal hospitals, asylums, penal and other institutions, there be made a careful study of the physiology and psychology of drug addictions.

(3) That there be enacted state laws of greater uniformity and embodying more efficient restriction of physicians, dentists and veterinarians in some such manner as is embodied in the Florida Statutes for 1915 or in similar laws.

(4) That all private institutions for the treatment of drug addictions be under the supervision and regulation of the several state boards of health and further that each state enact such laws as will abolish mail order cures.

(5) That each local medical society appoint a committee on Drug Law Enforcement, which committee shall be willing at all times to give expert testimony relating to narcotism when called upon by the local or federal authorities.

(6) That medical schools and training schools for nurses make a special effort to impress upon their pupils the need of greater caution in the administration of narcotic drugs. Your Committee regrets that the selection of the Advisory Committee has delayed its work during the

period which has elapsed since its appointment, but wishes to present for your consideration an outline, which has been adopted for the further carrying out of its work. This outline embraces a study of the narcotic drug problem in its various aspects as follows:

ETIOLOGY.

Subjective.

Heredity.
Alcoholism.
Psychology.

Extraneous.

Rôle of physician.
nurses.
druggist.
peddlers.
corner groceries and saloons.
commissary stores.
diseases:
 (a) Acute.
 (b) Chronic or recurrent.
accidents and operations.
army disease.
quack cures:
 (a) Institutional.
 (b) Mail order.
patent medicines.
interstate traffic.
 (a) Mail orders, postal orders.
 (b) Express service.
 (c) Messenger service.
 (d) Inter-urban.

Combined.

Social evil.
"Chinatown":
 (a) Opium smoking.
 (b) Prostitution.

Environment.

DISTRIBUTION.

1. Geographic:
 - North and South.
 - Canada.
 - Cuba.
 - Mexico.
2. Racial:
 - (a) White,
 - (b) Black,
 - (c) Nationality (Native born) (Foreigner).
3. Urban and rural.
4. Sex.
5. Age period.

ATTITUDE OF PUBLIC.

1. Of laity:
 - (a) Ignorance.
 - (b) Disgust.
2. Of physicians.
3. Of church.
4. Of educational institutions.
5. Woman's clubs.
6. Nurses' associations.
7. Public welfare associations.
8. Temperance leagues.
9. Press:
 - (a) Newspapers.
 - (b) Journals.
10. Police.

INSTITUTIONS.

1. Detentional:
 - (a) Prisons.
 - (b) Workhouses.
 - (c) Insane asylums.
2. Hospitals and sanatoria.
3. Educational:
 - (a) Medical schools.
 - (b) Colleges.
 - (c) Grammar and high schools.

OCCUPATIONS.

1. Brain workers:
 - (a) Medicine.
 - (b) Nursing.
 - (c) Journalism.
 - (d) Druggists.
 - (e) Teachers.
 - (f) Dentists.
 - (g) Church.
 - (h) Lawyers.
2. State.
3. Prostitutes.
4. Sporting class.
5. Mechanics and laborers.
6. Clerks.
7. Business men.

STATISTICS.

1. Importation.
2. Production (culture).
3. Manufacture.
4. Exportation.
5. Sale.
6. (Amount used legitimately, cocaine in particular.)
7. Illicit importation.

PRESENT NARCOTIC LEGISLATION.
(Including Canadian and United States Dependencies.)

BIBLIOGRAPHY.

In the selection of our advisory committee we feel that we have been fortunate in securing the interest and assistance of the following individuals:

Samuel Hopkins Adams, Ensenore, Cayuga Co., N. Y.
C. L. Alsberg, Chief, Bureau of Chemistry, U. S. Department of Agriculture, Washington, D. C.
President Clarence A. Barbour, Rochester Theological Seminary,
Surgeon General Rupert Blue, U. S. Public Health Service, Washington, D. C.
Surgeon General W. C. Braisted, U. S. Navy, Washington, D. C.
Rt. Rev. C. H. Brent, Protestant Episcopal Bishop of the Philippines.
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In submitting this report we would emphasize the fact that it is the opinion of the committee as a whole that the problem of narcotism is of far greater significance to this country than has been generally supposed; that existing legislation will not prove a solution and that the utmost effort should be made by the members of the American Public Health Association and all others concerned with the public welfare, to reach an early solution.

(Signed)

LUCIUS P. BROWN,
J. FRANK CHASE,
ERNEST K. COULTER,
GEORGE DONOHUE, M. D.,
JEANNETTE MARKS,
C. E. TERRY, M. D., *Chairman*.

Book Review.

The Mortality from Cancer Throughout the World. *Frederick L. Hoffman, LL.D., F. S. S., F. A. S. A., etc. The Prudential Press, Newark, N. J., 1915.*

In 1912 by invitation of the American Gynecological Society, Frederick L. Hoffman, the eminent statistician of the Prudential Insurance Company, delivered an address on "The Menace of Cancer" at an annual meeting of that society which was otherwise distinguished by the adoption of measures looking toward the organization of a national campaign of education for the control of this disease. Dr. Hoffman was led by this and similar requests to direct special attention to the available statistical data on the subject and his studies soon convinced him that the increasing prevalence of cancer constitutes a much more serious problem for the medical profession and the public than is commonly realized. From this starting point he became more and more deeply interested both in statistical research and in practical efforts to combat the disease. Finding that the data on cancer mortality were inaccessible to easy collection and comparison, Dr. Hoffman conceived and has now executed the ambitious project of his present work, which is appropriately dedicated to the American Association for Cancer Research, the special organization of laboratory students of this disease, and to the American Society for the Control of Cancer which was founded three years ago for the complementary purpose of bringing to more practical application the results already obtained by scientific investigation. The volume, handsomely printed and bound, is published by the Prudential Insurance Company which thereby adds new laurels to its record of substantial contributions to the scientific study of social problems.

Upon opening this eight-hundred-page book one sees at a glance what a prodigious range of information the author, with characteristic industry and thoroughness, has assembled and presented. Thus is foreshadowed his fundamental purpose which, as frequently emphasized in the preface and elsewhere, is not to attempt a final answer to the many questions involved in the study of malignant disease, but rather

"to facilitate the statistical study of the cancer problem throughout the world." To this end it has seemed to Dr. Hoffman "of more practical importance to provide the student of the cancer problem with the available material for statistical research, rather than with theories or criticism however well justified by the facts." This clearly defined purpose has been steadily adhered to in the selection and arrangement of the material presented. The work falls into two main parts; 200 pages of text discussion precede an extended section of tables, diagrams and charts, and other illustrative matter constituting the remainder of the book and arranged in eight appendices. In fact it may be said quite seriously that the work consists largely of these appendices which, with the bibliography and subject and author indexes, occupy 604 out of the 826 pages.

A closer examination of the several sections gives the reader an ever increasing realization of the mass and scope of this study and the enormous volume of clerical and mechanical labor and patient correspondence that must have attended its compilation. One sees also how faithfully the author has endeavored to carry out his purpose of making all the cancer statistics of the civilized world readily available under uniform and comparable arrangement in systematic tables prepared so far as possible on an identical plan and carefully listed and indexed. Since they constitute the substantial body of the work the several appendices merit brief description. In the first we find eight of the best known classifications of tumors. In the next section have been conveniently reproduced a number of forms and blanks used in special cancer inquiries, such as that made by the Imperial Cancer Research Fund, the United States Census Bureau, the New York State Department of Health, the International Cancer Research Association, etc. Appendix C gives eight tables of cancer mortality in relation to various occupations as recorded in England

and Wales, in Hungary and in the experience of the Prudential Insurance Company. The cancer mortality statistics of American and foreign life insurance companies occupy 121 separate tables in Appendix D. Appendix E offers in four extended tables a geographical survey of cancer mortality according to latitude, in the large cities of the eastern and western hemispheres, in the larger cities of the world, and in detail by organs and parts for thirteen principal countries.

The cancer mortality of the United States is thoroughly presented in the two sections of Appendix F. The first section contains seventy-four tables of the statistics compiled by the Bureau of the Census for the United States Registration Area and its constituent state and local subdivisions. The second part reproduces in 185 tables the original reports of all the more important American state and municipal registration offices.

In Appendix G follows an extraordinary assemblage of 378 tables of cancer mortality of various foreign countries, provinces and cities. The first of these tables summarizes the statistics for the entire civilized world, and the last gives cancer deaths by organs and parts in Montevideo from 1907-1911. Between these extremes all the leading countries of Europe and their principal cities as well as countries and colonies throughout Asia, Australasia and South America are extensively represented.

The last appendix reproduces several circulars and papers illustrative of the campaign for the control of malignant disease through educational propaganda.

The text comment and discussion occupying the first quarter of the book is arranged in nine chapters dealing with such topics as the statistical basis of cancer research, the increase in cancer, the occupational phases of the disease, the relation of cancer to life insurance problems, and the geographical incidence of cancer in America and foreign countries. In his final chapter the author offers a wide range of general observations and conclusions on the cancer problem, grouped under topics which refer to many of the questions the lay reader is most likely to ask. Space is lacking for an adequate summary of even the outstanding features of these readable chapters. Possibly one of the most interesting is that on the increase of can-

cer. The author has for some time been known as an earnest and militant protagonist of the view that the recorded increase in the cancer death-rate reflects for the most part a real and menacing increase in the prevalence of this scourge. This belief has led him to redouble his advocacy of such methods of warfare against cancer as promise to restrict and control its excessive mortality. Not without relish he again takes up the controversial weapons in this chapter and makes out a strong case for his views on this phase of the cancer problem which he regards as "one of the most important problems in modern medicine." Not alone the great mass of data tending to show an almost universal increase, but also the more impressive arguments which the author derives from his detailed analyses and comparisons will more than ever place the burden of proof on those who deny the reality of the increase of this disease.

A useful contribution to the study of cancer increase will be found in the author's effort to bring down to date the examination of the cancer statistics of Frankfurt-am-Main. As is well known, the statistics of this German city, owing to their detailed reference to organs and parts of the body, have provided a favorite battle ground of statistical controversy every since the classical argument of King and Newsholme in 1893. The conclusion reached in that well known paper that the cancer increase was only apparent was based largely on the Frankfurt figures showing "that in those parts of the body in which cancer is easily accessible and detected there has been no increase in the mortality from it between 1860 and 1889." Pointing out that King and Newsholme have failed to reexamine into the facts during the long period since 1889, Dr. Hoffman also calls attention to the serious defects of the Frankfurt classification of organs as compared with the one used by the Registrar-General of England and Wales for several years past, which is derived from the International List of the Causes of Death. Yet even on the basis of this defective classification, the author goes on to show, it appears from the Frankfurt figures for 1906-1913, here assembled, that among males the cancer mortality has increased in every group of organs both accessible and inaccessible except the respiratory organs, which are relatively unimportant. Among females

cancer of the respiratory organs and of the skin have decreased but cancer of the other groups increased, including cancer of the generative organs which King and Newsholme classified among the accessible forms. In other words, according to Dr. Hoffman, the most recent data do not confirm the earlier conclusion that the increase in cancer was only apparent and not real. Members of the American Public Health Association will recall that Professor Walter F. Willcox presented at the Jacksonville meeting in 1914 a preliminary paper on his original study of the Frankfurt figures from 1865 to date. Students of this particular topic will await with interest the completion and publication of Professor Willcox's conclusions.

Dr. Hoffman has rendered such notable services to the cause of cancer research and to the campaign for the practical prevention and control of this disease that it may seem invidious to suggest that his work leaves anything to be desired. The lack if any is perhaps most likely to be felt by the general reader who attempts to digest on any one occasion too many pages of the rather solidly printed text. The assiduity with which data have been collected from a wide

range of reading exhibits both the advantages and disadvantages of the method. The student who desires a reference volume will find here a veritable encyclopedia. On the other hand the author's inclusive purpose and method have possibly led to occasional faults of diffuseness and insufficient organization of chapters and sections, so that the trail of the argument is sometimes hard to follow through the forest of illustrative notes and remarks. One feels also the need of somewhat more critical differentiation among the authors and sources so frequently quoted. In such a catholic survey including references to many papers of less value it is surprising that the author should have failed to take account of the dissertation of Greenwood and Wood of the Lister Institute presented in 1914 before the Royal Society of Medicine. At the end, however, a feeling of wonder remains that the author in the midst of his arduous official duties has found the time, energy, and organizing capacity necessary to conceive and execute such a notable and exhaustive contribution to the statistical study of cancer.

Curtis E. Lakeman.

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Annual Report of the Department of Health, 1915, Richmond, Va. Chief Health Officer, Dr. E. C. Levy.

Annual Report of the Department of Health, 1915, Buffalo, N. Y. Health Officer, Dr. F. E. Fronczak.

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Annual Report of the Department of Health and Sanitation, 1915, Colorado Springs. Health Officer, Dr. Omer R. Gillett.

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Health Department Reports and Notes.

REPORTS.

Colorado Springs, Colorado.

This city of some 32,000 inhabitants reports a death-rate of 15.56 per 1,000, an increase of 1.03 over the 1914 rate. Believing that "the one object of the existence of our department is to lessen the number of cases of preventable sickness and death," a careful study of the death records was made to ascertain, as far as possible, the cause for such an increase. The results of this study well sustained the fact, lately realized by health workers, that the increase of deaths was due largely to organic disease among the higher age groups. In this city for 1915 there were twenty more deaths from organic heart disease, six more from arterio-sclerosis, seven more from apoplexy, and nine more from diseases of the kidneys, than in 1914, making an increase of forty-two in these four degenerative diseases. In comparing the ages at which the deaths occurred, it was found that under fifty years of age, the death-rate was less than in 1914, while over fifty there was a decided increase. There was also an increase in pneumonia in 1915, due probably to the epidemic of so-called "grippe" which was particularly hard on the tuberculars and aged.

It is pleasing to note that there was but one death from a contagious disease and only thirty-two cases of such diseases reported. No doubt the morbidity was kept down in the case of diphtheria by an extensive examination for

carriers. Five cases and eighteen carriers were found after an examination of 1,400 cultures.

There were only two deaths from tuberculosis contracted in that city. The peculiar position of this city, as a health resort for the tuberculous from all over the country, is well realized, and it is obvious that the comparatively high death-rate is due to non-resident deaths. This is best evidenced by the fact that the total death-rate of 15.56 per 1,000, by excluding the non-resident deaths, is reduced to 9.81. Thus out of a total of 498 deaths there were 217 bodies shipped out of the city.

Much credit is given to the work of the school nurse, who, though handicapped by having to cover a large territory alone, has been of great assistance in the detecting and tracing cases of contagious disease. It is hoped that it will be possible to have more nurses, and to have their work supplemented by medical inspectors.

In the anti-fly campaign, the rule, requiring the hauling away three times a week of stable refuse, has proven most satisfactory, and its benefits happily are recognized by the citizens. Much attention and excellent work is being accomplished in the control of the water and food supplies, and, though it is found difficult to impress dairy men of the value and necessity of personal cleanliness, other factors have been brought up to a high standard.

Brockton, Massachusetts.

The report of Dr. F. J. Ripley, Health Officer of this city of approximately 65,500, shows a fine record of work for 1915. The mortality-rate has reached the low figure of 10.49 per 1,000, an appreciable decrease from the rate of 11.64 for 1914. During the year 1,829 cases of contagious disease were reported, an increase over 1914, though this year the deaths from such were considerably lower. The increase is accounted for partly by a larger number of reports of minor diseases by the parents.

One hundred and ninety-seven cases of tuber-

culosis were reported with fifty-three deaths. An interesting comment on tuberculosis in comparison with all other contagious diseases is made, as follows:

"The total cost for tuberculosis work during the year was \$8,694.19, as compared with \$1,931.77 spent for the care of all other contagious diseases. It is readily seen that the tuberculosis problem is a big one, when you consider that 197 cases of tuberculosis were reported, as compared with 1,632 of all other reportable diseases. A comparison of the mortality shows that fifty-

three deaths from tuberculosis were recorded out of eighty-four deaths from *all* contagious diseases."

It is evident that one of the most pressing needs for this city at present is the establishment of a tuberculosis hospital, since now the department finds it difficult to provide treatment for the many cases reported. Active plans are now underway for the carrying out of this project.

The infant mortality was 2.8 per 1,000 inhabitants as compared with 3.7 for the state as a whole. Much of the credit for this low rate is due to the most careful milk inspection and the attention paid to the sanitary conditions of the city. It is gratifying to note the special work being done along this line, particularly in regard to post-natal care, the distribution of circulars in several foreign languages instructing mothers

in regard to milk supply and eye infections, and milk stations in the poorer sections of the city.

Brockton is to be congratulated on the quality of its market milk. At the recent state-wide contest, held by the Massachusetts State Board of Agriculture and the Massachusetts Dairy-men's Association, this city was awarded the silver cup for having the best market milk of the state. This is no doubt due to the belief, long held by the board of health, that the appearance of a dairy, as evidenced by its score, is no criterion of the character of its product, and so a dealer's product has long been judged by the product itself.

The health work of this city has constantly been of a creditable nature, and the increased per capita cost of health work to \$.72 seems well rewarded.

Haverhill, Massachusetts.

After a brief and excellent discussion on the tendency of the modern public health movement and its relation and significance to the activities of a city health department, this city reports the lowest mortality-rate in its history, 13.75 per 1,000 population, with the average age of the decedents the third highest in the last thirty-five years.

This lowering of the death-rate is remarkable since in almost every instance the morbidity from contagious disease was in excess of last year's records, there being 1,189 cases of contagious disease reported in 1915 to 666 cases in 1914, the greatest increase being in diphtheria and measles.

In accordance with the state law requiring the establishment of a tuberculosis dispensary, this city was one of the first to respond, and much credit for the carrying out of the project is due to the assistance and coöperation of the mayor and city council.

The number of school physicians was increased from two to four and an additional

visiting nurse was secured. It is hoped that another visiting nurse will be added to the staff to devote her entire time to work among the school children. Since the reports of the medical school inspectors show that less than 50 per cent. of the cases of poor teeth are attended to, the securing of one or more school dentists is advocated.

It is also recommended to transfer the inspection of plumbing to the building department. This plan has been discussed and adopted in several places throughout the country, chiefly in New Jersey, and the change seems logical. Another recommendation is the installation of a card catalogue system for recording contagious diseases. This certainly should be done, and the slight increase in expense is well set off by the increased efficiency of the department, both as to routine filing and to the following-up of cases.

The work of this department is a creditable example of the application of new methods and more extensive effort to meet the ever increasing demands of a growing city.

NOTES.

"We Are a People Striving for Healthful and Useful Living."—The monthly reports of the consolidated boards of health of Wilmington and New Hanover County, North Carolina, are inspiring examples of the splendid awakening

of the South to the importance of vigorous public health work.

The December report of 1915 contains a review of the remarkable work accomplished through four and a half years of continuous and sus-

tained effort. Thus the general death-rate fell from 29.43 in 1911 to 16.4 in 1915. Infant deaths fell from 1,123.03 per 100,000 in 1911 to 474.2 in 1915. The efficiency of the public health control is vividly shown in the death-rates from the communicable diseases. Typhoid fell from 100.98 in 1911 to 9.2 in 1915. Enterocolitis, an infectious diarrhea, caused a rate of 411.64 in 1911 but only 80 in 1915. Malaria, at one time one of the most prominent causes of death in Wilmington, fell to 6.1 in 1915. The tuberculosis rate shows a steady decline from 244.67 in 1911 to 163.3 in 1915.

"The past year has seen the introduction of a whole-time food inspector, a whole-time school nurse, the installation of a modern abattoir and reduction plant, the installation of modernly equipped meat markets with cold storage and refrigerating cases, three in number, the wider extension of modern dairying methods, a very great improvement in the quality of the local water supply, the establishment of complete coöperation between the Health Department and the Department of Streets and Wharves of the city in the collection and disposal of all trash and garbage and scavenging.

"The medical inspection of school children has been begun and the twenty-six rural schools of the county have already been inspected and a card index system, covering every rural pupil, is now a part of our record equipment."

The reports indicate that the community possesses a splendid health organization fully in touch with modern health methods and demonstrate to the "people of the city and county, the state and the South that governmental service can be rendered on a basis of maximum efficiency at a minimum cost."

Much credit is due to Dr. Charles T. Nesbit and his colleagues on the Board of Health. It is to be hoped that the people concerned realize the valuable asset they have in this group of scientific and enthusiastic servants.

*

The Kentucky Sanitary Privy.—The May *Bulletin of the Kentucky State Board of Health* is entirely devoted to an extensive description and discussion of a privy of its own design, which promises to be "a practical solution of the problem of sewage disposal for homes, schools, railway stations, jails, and hotels, in unsewered towns and country districts."

After discussing the results of faulty and inefficient disposal of intestinal discharges, an efficient privy is described as, "uniformly safe in its operation; must cost so little as to be within the means of every one; must be simple in construction, fly proof, water tight, and have no unpleasant odor; must be largely self-operating so as to require little care and no handling of its contents," which requirements are fulfilled by the Kentucky privy.

There are several types of this privy, as most suitable to given conditions, but the essential features are as follows:

"The essential principles of the Kentucky sanitary privy are the tank, including the seat, the tile drain system, and the house, the only purpose of which is to screen the body. The house may be of any convenient type. Preferably, it should be well designed, and always screened. The seat should be comfortable. The lids must be well fitting to exclude insects. Again, for emphasis, we repeat that the tank and drainage system must be patterned exactly after one of the designs given in this *Bulletin*, if the best results are to be secured. Reference to the illustrations will indicate that the tank is practically a single solid rock, made of concrete, with three distinct chambers. The first, or receiving chamber, is open to the air. This is separated from the middle chamber by a concrete wall which comes within twelve inches of the bottom, allowing the liquid contents to flow from the first into the second chamber. The middle chamber is separated from the third by another wall which extends from the bottom to within eight inches of the top, and over which the contents of the tank flow intermittently into the third chamber. A tile or concrete elbow connects this third chamber with the drainage system. The roof of the tank forms the floor of the house, and the roof of the first chamber is taken up by the seat and lid. The second and third chambers are air-tight if properly constructed.

"After the concrete tank is completed and set, or hardened, it should be filled with water until it overflows into the tile drain. This water is then charged with our nitrifying germs or bacteria by pouring through the seat a coal-scuttle or two of black, moist, well-rotted horse manure. These nitrifying bacteria are now ready to liquefy any animal waste which is discharged into the

tank. They feed upon the bowel discharges, and destroy toilet paper of the right kind. Of course, no heavy paper, nor sticks, nor cobs, nor any substantial thing of that kind should be put into the tank under any condition at all. The animal discharges are liquefied in the tank, and as it passed through the drainage system it is changed into harmless plant food.

"The tile drainage system is important. Where it is impossible to secure tile, it may be built of rock, as shown later, and its purpose is to receive the overflow, and to allow the disposal and utilization of what has really become harmless but valuable fertilizer where it can do good."

Complete instructions are given for the construction of the several types described. At present the Board of Health estimates that about 99 per cent. of the privies in Kentucky are inefficient and dangerous, and urgently requests the speedy adoption of this privy in order to the sooner stop the spread of infectious diseases.

*

Coöperation with Welfare Department.—The following brief notice appears in a recent monthly bulletin published by the Department of Health of Dallas, Tex. The necessity of full and active coöperation between the several divisions of a health department has long been realized, but too often it has gone no further. The Welfare and Sanitation Divisions of Dallas are now given an opportunity to share in experiences and to coöperate to their best advantage. It is to be hoped that the project will prove to be distinctly worth while.

"It is now well understood that in modern communities the social and economical aspects of family life are most intimately related to the sanitary condition of the home and its surroundings, and especially to the health of the individual members of the family. There is thus a direct connection between the activities of the social service workers, the sanitary inspectors, and the public health nurses, which should be taken advantage of in every way possible. With this in view the departments of Public Welfare and Public Health are planning to hold each month a joint meeting at which the social service workers may become better acquainted with the work of the sanitary inspectors and public health nurses, and *vice versa*. It is confidently expected that these meetings will result in an even greater

coöperation between the two departments than exists at the present time, as well as in increased efficiency in many of their activities."

*

The Foundation of Modern Medicine.—We quote below part of the introduction to the July *Health News* published by the New York State Department of Health. This excellent impression of the tendencies of modern medicine introduces descriptive discussions of the state laboratory service in an effort to demonstrate to the physicians of the state what the laboratories have done, and also to encourage a greater extension of laboratory facilities.

"The age of giants in medicine has passed into history and with it much of the romance of personality that formerly surrounded medical practice. The struggle of the keen intellects of by-gone days to penetrate the dark veil that enveloped the origin of disease, the shrewd guesses at what we now know to be the truth as well as the promulgation of many theories now known to be false, arouse our admiration and sympathy.

"The worship of individuality has given way to the elevation of mediocrity and to the advantage of the common welfare. In medicine, as in war, success lies not with the genius but with him who is able to make use of technical skill. This revolutionary change has been brought about by one agency—the medical laboratory—and allowing for the widest variation in the personal factors of intellect, training and devotion to duty, the modern practitioner is competent or incompetent in proportion to his general familiarity with and employment of laboratory methods of diagnosis and the institution of treatment which frequently depends upon them."

*

New Law Provides "Dental Hygienists."—The Governor has just signed a bill which provides for the training, registration and licensing of dental hygienists. This marks the enactment into law of recommendations made some time ago to the Department of Health by one of its advisory committees. The committee's action was due to the great need for increased attention to the condition of the teeth of school children in New York, of whom, it is asserted, at least 90 per cent. require dental treatment.

A subcommittee, appointed to investigate the

matter, recommended the desirability of using dental hygienists and urged that a trial of the surface cleaning of children's teeth be made as soon as possible in one or more centers, preferably public schools, and that at the same time the children be given instruction in oral hygiene.

The new law provides that any dental dispensary or infirmary, legally incorporated and maintaining a proper standard and equipment, may establish for women students a course of study in oral hygiene. Such students shall present evidence of one year's attendance at high school, and after one year may be graduated as dental hygienists, upon complying with the preliminary requirements to examination. After satisfactorily passing the examination these students shall be registered and licensed as dental hygienists by the regents, under such rules as the regents may prescribe. Any licensed dentist, public institution, or school authorities may employ such dental hygienists, who may remove lime deposits, accretions, and stains from the exposed surfaces of the teeth, but shall not perform any other operation on the teeth or tissues of the mouth. The law follows the enactment of similar ones in Massachusetts and Connecticut, and it is expected that with the preventive steps made possible by the employment of such workers the condition of the teeth of the coming generation may be greatly improved.—*Health Bulletin*, New York City.

✱

Health Officers.—The following plea to allow health administration to transcend political favor is registered by the Wisconsin State Board of Health in its recent monthly *Bulletin*. In the reorganization of the local boards of health throughout the state, it is hoped that the full significance of such appointments will be realized.

"This is the season of the year when practically all the local boards of health throughout the state will be reorganized, and where the health officer or health commissioner has served for two years, a new health officer or health commissioner will be selected. It is the earnest desire of the State Board of Health that the local boards of health exercise every possible care in the selection of new health officers. If the present health officer has rendered satisfactory service, he should be retained in office if possible. A

responsible position of this kind should not be passed around as a political favor as is done in so many places. The most competent and conscientious physician should be selected for the position as health officer and his compensation should be such that he will perform the duties of the office in an acceptable manner. The longer a good health officer is in office the more competent he becomes. There is no more important office in any township, incorporated village or city of this state than that of health officer, and we hope where a new health officer or health commissioner is to be selected, the best possible person for the place will be chosen."

✱

The Prevention of Typhoid by Vaccine.—The May *Bulletin of the Health Bureau of the City of Rochester*, New York, contains the following brief résumé of the efficacy of typhoid inoculation:

"In 1893, Fraenkel called attention to the use of vaccines in the prevention of typhoid. Subsequently it was taken up by Ross during the Boer War, and later by our own Russell, who shows that in 1914 of 92,000 soldiers of the United States army 35,000 were vaccinated and only seven contracted typhoid.

"During the comparatively short Spanish-American War there were more than 20,000 cases of typhoid fever among a little over 100,000 men, with 1,580 deaths. In the Boer War the English had 31,000 cases with 5,877 deaths. In the United States army there was, prior to vaccination, in 1908 and 1909, an average of 250 to 300 cases per annum on a mean strength of 74,000 to 84,000. After vaccination typhoid practically became a disappearing disease, and the records show but two cases per year in the two past years out of a total strength of 92,000 men.

"There can be no question but that typhoid vaccine has come to stay, and that the use of typhoid vaccine, intelligently pursued, will give a large number of immunes, a smaller number of cases and a very much smaller number of deaths. For it is to be remembered, that now typhoid fever is not (at any rate in the eastern part of the country) contracted so much from water supply as it is from the milk supply and from accidental food contamination, and, in all probability, from that contact which results from the

putting of the dirty fingers into the mouth. Typhoid fever is, therefore, a contagious disease.

"Vaccines—Typhoid vaccines are easy to get and not difficult to give, and the reactions attending them are not severe, not more than 2 per cent. of the vaccinated react severely. And, if one wishes to prevent the danger of a severe reaction attending the initial dose, he may, of course, split the initial dose, giving it in two doses instead of one. Or, he may split all the doses.

"The question, how long does a prophylactic vaccination remain good, is to be answered with some difficulty. People freshly vaccinated with vaccine rarely get typhoid, and they very rarely die of typhoid. But vaccination against typhoid offers a measure of protection that is nearly absolute. Its use is practically devoid of danger, and it offers protection, probably, for much longer than three years. Much work has been done to try to determine the length of time for which typhoid vaccine provides immunity. A positive Widal reaction is not always a good test for the length of immunity; for while the Widal reaction may disappear, the vaccinated person may still be immune to typhoid. Gay and Claypole, of the University of California, have been trying to devise a test for the determination of the duration of typhoid immunity. In 80 per cent. of the cases tested, their test was positive in freshly vaccinated persons and negative in those who had not been vaccinated."

✦

Pure Water for a Million Californians.—A million people in California are drinking chlorinated water, according to the California State Board of Health. This means that one third of the population of the state is assured of a fairly safe water supply.

As a cheap and reasonably efficient method of removing the dangers due to the presence of typhoid and like germs, there is no form of treat-

ment known at the present time that can compare with chlorination. The California State Board of Health has recommended and sponsored the use of this method of water purification for a great many of the water supplies of the state. Among the cities that have recently adopted this method are Los Angeles, Oakland, Sacramento, San Diego, Pasadena, San José, Eureka, Antioch, Benicia, Auburn, Pittsburg, National City, La Mesa, East San Diego, Santa Barbara, San Luis, Obispo, Monterey, Redding, Merced Falls, El Centro, Berkeley and Alameda. In addition, public swimming pools in Oakland and San Francisco are also chlorinated.

One of the most striking examples of the efficiency of chlorination in purifying water is shown in the experience of the city of Sacramento. In 1914, before chlorinating the water supply of that city, there were 253 cases of typhoid fever, while during the first six months of 1916, since the purification system has been installed, there were but eight typhoid cases reported.

The flexibility of chlorination plants is greatly in favor of this method, since it may be used for a supply as small as 100,000 gallons per day for a town like Merced Falls, with a population of 1,500, or for a supply of 10,000,000 gallons per day, serving a population of 180,000, as in the city of Oakland.

Forty chlorination plants are reported as already installed in Oregon, Washington, Arizona, Utah and New Mexico, while twenty-nine plants are now installed in California. The California State Board of Health is recommending this method of purification to all cities drawing their water supplies from questionable sources, and as soon as this method has been adopted in all cities of the state which draw their water supplies from such sources, there will, no doubt, follow great reductions in the communicable disease rates.

Public Health Notes.

Diphtheria in the First Year of Life.—It has long been noted that diphtheria has been comparatively rare at this period of life. Doctor Rolleston of London, England, writing in the *American Journal of Diseases of Children* presents an interesting study of such cases observed

during the past fifteen years of the diphtheria patients admitted to the Metropolitan Asylums Board's Hospital. He summarizes the situation as follows:

"1. Diphtheria in the first year of life is comparatively rare. Only twenty patients at this

age occurred among a total of 2,600 diphtheria patients of all ages.

"2. Congenital syphilis is an important predisposing cause.

"3. Sixty-five per cent. showed some nasal involvement, with or without other diphtheritic lesions elsewhere, as compared with 25.6 per cent. in the total. Thirty per cent. were purely nasal, as compared with 1.5 per cent. of the total cases.

"4. The mortality was high, 45 per cent., as compared with 7.3 per cent. in the total.

"5. Paralysis was rare, two cases; bronchopneumonia, six cases, was common.

"6. A history of infection was obtained in only three cases."

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The Medical Profession and Health Conservation.—The *Journal of the Florida Medical Association* for June, 1916, prints an interesting address of Dr. R. H. McGinnis in which he points out that:

"Much as has medical science done and is doing for health conservation, through its various avenues of instruction of the public, continued and strenuous effort is demanded. The public is rather slow to understand the necessary individual requirements that are conducive to good health. While a large portion of the misunderstanding is due to ignorance, there is also a large proportion due to indifference, carelessness and neglect. If this latter portion could be convinced and it acted upon its conviction, a great instructive force would be propagated that the resistance of ignorance could not prevail against. The human being is so constituted that he will take chances, especially with his health. He will speculate with it to a greater extent than with financial interests. He makes his body an exchange into which he puts various and sundry ventures, without proper consideration, trusting the body to produce a dividend on the investment. The body, constructed for emergencies, will respond for a time, but sooner or later its reserve is expended and collapse ensues. The damage is done, rejuvenation impossible and repair questionable. The measure of success in this propaganda of health conservation depends on the activities of the profession. The trend of the profession, at present, presages the ultimate eradication from its own ranks the incompetent and unqualified, and when the

public support the profession's initiative, an era of health conservation will have advanced a long way. Education is the hope of success."

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Cancer as a Non-Surgical Disease.—Dr. L. Ducan Bulkley, writing in the *New York State Journal of Medicine* for June, 1916, lays emphasis on the fact that:

"Cancer is not a surgical disease, although of late years cases of this nature have been almost always relegated to the surgeon. It is true that the local results of the cancerous process can be removed by surgical measures, and that the wound may heal primarily and that in some proportion of instances the tissues may remain sound. But the experience of all has shown that the mere removal of the cancerous tumor and adjoining tissues surgically does not insure that the disease will not return in or near the scar, or elsewhere. It is now recognized and acknowledged that somewhere about 90 per cent. of those once affected with cancer die from that malady. Surgery as a cure for cancer has been tried in the balance and found wanting."

Thus far in the study of cancer the points acknowledged may be mentioned under these heads:

"1. Clinically and experimentally cancer is shown to be not contagious or infectious; although under just the right conditions certain malignant new growths can be inoculated in some animals, but human cancer cannot be transplanted.

"2. Although micro-organisms of many kinds often have been found and claimed as the cause of cancer, there has been no concurrence of opinion in regard to them, and it is now pretty conclusively agreed that cancer is not caused by a micro-organism or parasite.

"3. Cancer is not wholly a result of traumatism, although local injury may have much to do with its development in some particular locality, even as in connection with late lesions of syphilis.

"4. Cancer is not hereditary in any appreciable degree; although some tendency in that direction has been demonstrated in certain strains of mice.

"5. Occupation has not any very great influence on the occurrence of cancer; although it is more frequent in some pursuits than in others.

"6. Cancer is not altogether a disease of older

years; although its occurrence is decidedly influenced by advancing age.

"7. It does not especially belong to or affect any particular sex, race, or class of persons.

"8. Cancer is not confined to any location or section of the earth, but has been observed in all countries and climates.

"Is it not, therefore, high time" says Doctor Bulkley "that serious attention be directed away from the purely surgical treatment of a symptom or result of a great disease, and that careful inquiry should be made into the underlying causes which ultimately result in such a great relative mortality, approaching 90 per cent. of all those affected, exceeding that of any other one disease?"

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The Physician as an Aid to Industrial Progress.—"Industrial progress is dependent primarily on health." This is the point developed by Dr. E. W. Warren in an interesting paper appearing in the June number of the *Florida Medical Journal*:

"No industrial enterprise attains its maximum success unless it makes reasonable provision for the health of its employees. Neither employer or employee is capable of his fullest activity when suffering from physical discomfort or is under the dread of disease. To do his best he must be a contented individual. He must not only be protected from disease and injury but his family must have every assurance that contagion and infection will be kept as far from them as possible. When the employee is assured that injuries received in performance of duty are to be properly cared for he will the more cheerfully put forth his best effort. His position at present demands more. He must know that every possible precaution is being taken to see that the hygienic and sanitary conditions surrounding his living quarters are the best and the health of his family provided for. Certain industrial enterprises at the present time are initiated by preliminary health surveys, the establishment of sanitary regulations and the removal or correction of unhealthful conditions before it is thought wise to begin operations.

"The gradual but increasing recognition of these facts has developed a new line of activity for the physician—that of taking care of the public health, or the health of the public. It is a broader field than that of treating the sick

individual. It is an effort to keep individuals well *en masse*."

"The fight will be made and the victory won by hygiene. The enemies are the microbe and ignorance, the weapons are education, the sanitary inspector and health regulations. The sensational headline in the newspaper announcing the much dreaded yellow fever or bubonic plague, with its consequent business paralysis and economic loss, will be no more."

✱

Health Conservation through Life Insurance Companies.—"From the very start insurance companies have been in the lead in matters of general sanitation, hygiene and right living," writes Dr. John L. Davis in the *Southern Medical Journal* for July.

"The company's business success depends primarily upon the longevity of its policy-holders; therefore, the company is vitally concerned with everything that promotes health and prolongs life in the community—hygiene, sanitation, better homes, shorter working hours, improved machinery and safety devices, better education and training of men and women; in short, everything that tends to the human uplift—whether physical, intellectual or moral—interests insurance companies."

"In our warfare for human life conservation, the battle line before us presents four divisions for our attack:

"1. Diseases to a greater or less extent preventable and very disastrous, viz., consumption, typhoid fever and malaria, and to a less degree, hookworm, pellagra, ordinary diseases of childhood, etc.;

"2. Alcoholic liquors, which directly or indirectly cause a vast amount of sickness, death and economic loss;

"3. Occupational disease, leading to unnecessary sickness and death through various features such as atmospheric pressure, the gases engendered, the metallic poisons and dust, the overheated air, excessive fatigue, etc.; and

"4. Accidents, due to improper and unprotected machinery, tools, unsafe surroundings, etc."

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New Jersey Inviting Malaria.—"A practical hint to northern sanitarians may be found in a recent report by Major P. M. Ashburn, Medical

Corps, United States Army, concerning the tendency of malaria mosquitoes to follow human beings, even to great distances. The frequently mentioned flights at Gatun are proof of this.

"Major Ashburn went to the Canal Zone as general inspector of the Department of Health. He soon learned, from conversation with sanitary inspectors, that places which a few years ago, when populated, had been hot-beds of malaria and great breeding-places of *Anopheles* mosquitoes, now, since the inhabitants had moved elsewhere, have few or no *Anopheles*. And further, even the temporary camps of construction gangs have been known to bring malaria carriers into a neighborhood; the departure of workmen, it has been noted, was followed by a disappearance of *Anopheles*.

"One important demonstration of this habit occurred at a contractor's camp at Caño Saddle. The camp was opened in November, 1913, in a previously uninhabited location. Promptly the number of *Anopheles* began to increase, rising into hundreds during the four months of the camp's existence, abruptly dropping again when camp was broken, May 1. From the inspector's weekly record the following figures are taken:

Week Ending	Malaria Carriers
December 6, 1913.....	6
December 13, 1913.....	34
December 20, 1913.....	165
January 31, 1914.....	1,211
March 7, 1914.....	3,277
May 9, 1914.....	87

"By the middle of December the inspectors predicted malaria, though the first actual cases appeared only in the first week of February. On March 18, malaria was found in the blood of 9.7 per cent. of the workmen; on March 31, malaria was in the blood of 20 per cent.; the percentage was yet higher in April, when the adaptation between the malarial organism and its "host" had become established.

"We are justified in stating," concludes Major Ashburn, "that, at Caño Saddle, a place highly favorable to malaria . . . *Anopheles* did not greatly abound until after the laborers had been there for three weeks or more, and malaria made no headway until after two months. It is probable that that uninhabited place was also uninhabited by mosquitoes capable of bearing malaria until the workmen took

them there and created conditions particularly favorable for their breeding."

"The problems of the Canal Zone are, it seems, in course of being imported into some hitherto malaria-free states. The demand for labor, especially in war industries, and the cessation of much of the work on the canal, have resulted in the migration of Mexican and negro workmen from Panama to the great explosives of New Jersey.

"This means that centers of malarial infection will almost undoubtedly be created in this state, for mosquitoes around and, wherever there are mosquitoes in this country, some specimens of *Anopheles* are found. Of late years they have been of no great importance in the North because the malarial organism was lacking; but now, human carriers of the organism are arriving on the scene and the chain will be complete.

"Years ago Robert Koch told the Italian government that the solution of the malaria problem in Italy lay in ridding the land of human carriers, since the mosquito could never be wholly eliminated. In consequence, Italy undertook an extensive free quinine treatment of her malarial population. The same situation will face New Jersey unless prompt preventive measures are taken."—*Survey*, July 22.



The Rational Treatment of Tuberculosis.—Dr. August M. Kinney, in the July *Northwest Medicine*, presents an interesting study of the vaccine treatment of tuberculosis. He declares that this method is not associated with empiricism but, on the contrary, is based on absolute scientific facts and deductions. He arrives at the following conclusions as the result of a long experience in the treatment of tuberculosis:

"1. There is no treatment nor influence that is at all comparable with the effectiveness of the vaccine treatment (skillfully handled), in addition to proper dietetic and hygienic treatment in tuberculosis uncomplicated with other affections.

"2. Using the treatment above outlined with the patient under proper control, almost every case of incipient, a large number of moderately advanced, and many of the far advanced cases of tuberculosis can be permanently cured.

"3. The use of an appropriate autogenous vaccine as an adjunct to tuberculin has decided advantages.

"4. Tuberculin should be given with great caution by a physician well trained in vaccine and serum therapy and one who is a thorough examiner of the lungs.

"5. The doses of the vaccine heretofore used and recommended and the frequency of dosage should both be greatly reduced in order that the best results are obtained. Size of doses and intervals between doses can only be determined by a thorough study of each individual case. Begin with an exceedingly small dose and do not reinoculate until all time for reaction has passed. Success comes by guarding against the excessive stimulation of diseased tissue.

"6. While we do not in any way wish to deprecate sanatoria, it is our experience that the majority of cases amenable to cure respond equally as well if not better under a well regulated, routine, home treatment."

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Rest and Exercise in Tuberculosis.—The place of both rest and exercise in the therapy of tuberculosis is discussed by Dr. Thompson Frazer in the July number of the *Southern Medical Journal*.

The chief points which he brings out in the paper are:

"1. That a thorough knowledge of the principles of rest and of exercise must underlie the treatment of tuberculosis.

"2. That neither exercise nor rest is to be prescribed off-hand, but that so long as there are symptoms pointing to an overworked body rest is indicated, the character and amount to be carefully prescribed; and that with improvement exercise slowly increased provides the safest means of regaining health and strength.

"3. That exercise must be very gradually increased, as a single act of overexertion may delay recovery months or years, or even make it impossible to attain.

"4. That the transitional period referred to should be continued under careful medical supervision until the patient is able to stand without harm more than he will be called upon to stand when he takes up active work.

"I believe that if these points are duly considered, and that if, instead of vaguely advising rest or exercise, we limit the amount and character of each with the aim of returning our patients to a condition in which they will be able success-

fully to cope with their changed environment, that in the future we shall hear less and less of relapses and shall be able to accomplish what should be our chief aim—an economic cure."

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Appoint Committee on Activated-Sludge Process.—Members and associate members of the American Society of Civil Engineers interested in sewage disposal met informally June 28 in Pittsburgh to discuss various problems in connection with the treatment of sewage by the activated-sludge method. The report of the acting secretary, T. Chalkley Hatton, dated July 6, states that the time has not yet come for effecting a permanent organization to avoid duplication of experiments in the United States and Canada and preventing control of the activated-sludge process by patents issued without complete information having been submitted to the commissioner of patents. Believing that the best results could be obtained through a committee and personal service, F. A. Dallyn, provincial sanitary engineer, Toronto; George T. Hammond, engineer of designs, Borough of Brooklyn, New York City, and T. Chalkley Hatton, chief engineer of the sewerage commission, Milwaukee, were appointed to prepare standard definitions and other terms relating to the activated-sludge process of treating sewage. They will also tabulate and distribute a summary of work now being done or contemplated and suggest such correlation of current work as may be desirable.

The question of submitting to the commissioner of patents information relating to priority of knowledge of the activated-sludge process was left with Prof. Earle B. Phelps, H. W. Clark, George T. Hammond and Dr. Edward Bartow, with the understanding that all members present should assist by giving the commissioner all possible information in affidavit form.—*Engineering Record*.

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A Message from the Grave.—We are indebted to a recent *Weekly Bulletin of the Cincinnati Department of Health* for the following additional bit of testimony against quackery:

"Under date of May 24 'Tanlac' advertisements appeared in Cincinnati, announcing in heavy type: '*He Gave Up Hope; Was Unable*

to Hold Job. Flora Street, Man Had Kidney Trouble. Today Says Tanlac Restored His Health.'

"The man 'credited' with the 'testimonial' is described as a tailor with 'kidney trouble attended by severe pains in the back,' who 'had no appetite and was in a run-down condition'; who 'hardly ate enough to keep a chicken alive' and whose 'trouble came on like this': 'Several years ago, I had an accident and my leg was broken in five places. This weakened me and I did not seem able to get over it. My health ebbing and ebbing to such an extent that I just gave up hope. Of course I gave up my job and was unable to work.'

"At this critical period he began to take 'Tanalac' and 'after taking several bottles of Tanlac' desires to say that, 'It is the greatest medicine on earth. It has given me back my health and with it my strength and vitality.'

"*'My old enemy—sore stiff back and pains—have entirely left me—entirely—did you get that? I eat and sleep good and feel better in every way.'* (The italics belong to the Health Officer.)

"Ordinarily the above statement would create very little in the way of comment, but when it is known that the testimonial came from a man *two days after his death*—'did you get that?'—then it is plain that we are bordering on the supernatural and that the Society for Psychical Research is due to take notice.

"Keep the dates in mind—testimonial appears May 24—death certificate on file in the Cincinnati Health Department shows that death took place on May 22.

"No wonder that 'my old enemy,' sore, stiff back and pain, have entirely left me.' While there is room for reasonable doubt concerning the accuracy of the statement 'I eat good,' no one will question the accuracy of that other portion of the testimonial 'I sleep good.'

"The question naturally arises, 'Do the people financially interested in Tanlac "sleep good?"'

"The possibilities arising from a judicious employment of this remedy are respectfully referred to 'spiritualistic mediums.' Armed with a bottle of Tanlac the historic trumpet can be discarded entirely, or, better still, transformed into a useful dinner horn. Post-mortem testimony can be secured in murder mysteries and contested wills can have real light shed on obscure details. The possibilities residing in a

bottle of this 'greatest medicine on earth' are not bounded by reason, experience, or the imagination. *Do the manufacturers of Tanlac really 'sleep good?'*"

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Out-patient Service Efficiency.—Lovell Langstroth, San Francisco (*Journal A. M. A.*, July 8, 1916), has analyzed 348 records of an out-patient clinic in which a uniform plan of questioning, testing, keeping records of visits, diagnose, references to other departments and results of treatment was adopted. The results are summed up in the following conclusions: "It is obvious from an examination of the preceding figures that the number of cases is too small to determine the value of the different laboratory procedures. They are merely suggestive and might form the basis of future investigation in which a larger number of cases could be considered with these points in mind. Certain facts are brought out, however, and the following conclusions seem justified: 1. Thirty-eight per cent. of the patients failed to return after diagnosis. The introduction of a follow-up system would decrease the percentage. 2. Eleven per cent. of the patients did not return a sufficient number of times to justify making a diagnosis. The institution of a department for preliminary examination of the patients is suggested in order to assign the cases to the proper departments and to eliminate those who come to the clinics for trivial causes. 3. There were twenty-seven cases, or 7 per cent. of the whole number, in which it was not found possible to make a definite diagnosis. 4. Seventy-five per cent. of the patients sent to the hospital for further examination or treatment had a correct admission diagnosis. 5. Much of the time lost in referring patients to other clinics for consultation might be saved by equipping the medical department for the commoner special examinations. 6. Only 38 per cent. of the patients in this series were benefited by their visits to the clinics. 7. Eighty-three per cent. of the patients did not return to the clinics after three months. I feel that those who have taken an interested part in out-patient work will agree that there is here the same need for careful attention to detail and effectiveness as in hospital work, but that this is rarely given. The figures show that this work, when considered from the point of view of the end-results, is disappointing, and

they are given with the hope of stimulating interest in out-patient work and raising its standard.

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She Took no Chances.—The following amusing incidence, showing to what a ridiculous extent precaution may be carried, is given in a communication to the *New York Times*:

PARLOR CAR PASSENGER SPRAYED HER NEIGHBORS WITH DISINFECTANT.

To the Editor of The New York Times:

I was hardly seated in my parlor car chair on Monday on my way from New York City to Saratoga Springs when a young woman walked up to me and without a word of explanation or apology sprayed me with a vile-smelling disinfectant. Before I had time to protest she was half way down the car spraying everybody and everything as she passed. Two young men *en route* for Plattsburg were especially favored. Each of them was sprayed twice. When the entire car smelled like a hospital she returned to her seat opposite me, where her two little children were sitting.

"Yes," she said, in answer to the question of the mother of a small boy. "I, too, am leaving town because of the epidemic and I am taking no chances." Again she squeezed the bulb of the atomizer and I buried my nose in my handkerchief.

I. B. O.

Lake George, N. Y., July 12, 1916.

Industrial Hygiene and Sanitation.

The following, appearing in the *Travelers' Standard* for July, is, because of its general interest, repeated here in full:

"RESUSCITATION.

"A prominent physician in a large city has said that 'if all the physicians of the city were called to attend a case of suspended animation from electric shock, 90 per cent. of them would be at a loss as to how to proceed.' This may correctly describe the state of affairs in some particular city, but it is probably too broad and sweeping to fairly represent the medical profession as a whole. If the statement were applied to the adult population of the entire coun-

Campaign against Venereal Disease in the Army.—Fragmentary reports received from Europe show that the venereal diseases constitute one of the most serious and troublesome health problems for the military health officers of the nations engaged in the great war. The same problem has existed and been recognized in our own army, but now assumes greater importance in consequence of the mobilization of our national guard troops and their assembling on the Mexican border and in various state camps. There is grave warning of impending danger in the reports of the ravages of these diseases at the time of the Spanish War and of their spread among the civilian population when the military organizations dispersed at its close.

With these lessons in mind, the American Social Hygiene Association is seeking to co-operate with national and state military authorities, with the Y. M. C. A., and with state and local social hygiene societies in educational and medical measures to prevent and control venereal disease among the regular and national guard troops. Plans for this work are not yet fully worked out, but they include both preventive efforts through the use of special printed matter, by social and recreational agencies, and by the repression of prostitution in the vicinity of the camps, and also remedial measures for prompt and adequate diagnosis, treatment, and control of all venereal infections.

try, however, it would no doubt be very conservative; for we are inclined to believe that less than 1 per cent. of the general public have the necessary knowledge.

"If this estimate is anywhere near correct, it follows that many lives are unnecessarily lost, merely because persons who witness an accident from electric shock and who have the physical ability to render effective aid, do not know what to do. The same is true of drowning also, and now that the vacation season is at hand, we may expect to hear the usual number of reports of drowning accidents, and of lives lost through lack of information as to how to proceed to resuscitate an unconscious person, or 'bring him

back to life.' It appears to be desirable, therefore, notwithstanding the many articles that have already been written on the subject, to refer again to the various methods of resuscitation, so that those who cannot immediately command expert assistance may be enabled to meet an emergency of this kind intelligently.

"Unconsciousness brought about by immersion under water, or by electric shock, or by exposure to gas or smoke, need not terminate fatally, if immediate efforts are made to restore and promote respiration; but there must not be the least unnecessary delay if the efforts to revive the affected patient are to be successful. Resuscitation may in fact be classed as 'first and final' aid, and in this respect it differs radically from 'first-aid' treatments as applied to injuries. A workman suffering from a fractured bone, or from a burn, cut, or laceration, may receive first-aid treatment, including dressing and bandages, and these, if properly applied and administered, will relieve suffering, prevent infection, and assist in recovery; but even if first-aid materials are not available, or if those that are at hand are not put to proper use, the patient's life is not necessarily endangered. As soon as proper medical aid is administered, the harm due to the lack of first-aid treatment, or to unskillful manipulation by untrained persons, may often be checked or counteracted, and a start for recovery made. The likelihood of rapid recovery under unfavorable conditions of this kind is not so promising as it would have been if proper first aid had been given, and yet a patient suffering from minor bodily injuries is ordinarily in no immediate danger of death, and he has a good chance to recover, if errors and omissions in treatment are corrected without protracted delay.

"But a person in a state of suspended animation has only one chance for his life, and that consists in making immediate and properly directed efforts to supply his lungs with oxygen by means of artificial respiration. There must not be the least delay, or the sufferer will die—not from his direct injury, but from asphyxiation or 'suffocation.' To send for a physician and an ambulance, and then wait for them to arrive without striving to restore respiration in the meantime, is almost certain to result fatally; and if the bystander can do no more than this,

it might be more logical for him to merely notify the coroner's office of the accident and the physician alone, for the physician's sole duty in practically every such case is likely to consist in pronouncing the patient dead.

"Except in exceedingly cold weather, it is not necessary to move the patient to warm quarters, although it is important to keep him warm as is consistent with the immediate establishment of respiration, which is the first thing to attend to under all circumstances. The advantages gained by carrying a victim of a drowning accident to a house or hotel are absolutely insignificant in comparison with the disadvantage of the delay consequent in starting artificial respiration, for a very slight delay will often determine whether success or failure will attend the efforts to revive the patient.

"There are three prominent methods of resuscitation by inducing artificial respiration, which are respectively known as the prone-pressure or Schafer method, the Sylvester-Laborde method, and the automatic or mechanical methods typified by the pulmotor, lung-motor, and other mechanical devices. Certain advantages are claimed for the prone-pressure method as compared with the other two, and one of its most important features is its simplicity. Only one adult operator is required, and he can carry on resuscitation efforts for several hours without undue fatigue. With this method there need be no delay for procuring apparatus or extra assistance. In the average case, the patient may be placed in the proper position, and artificial respiration actually begun, in thirty seconds. The patient should be laid face downward, and his arms should be drawn forward, parallel to his body, so that they will lie close to his head. His face should then be turned to one side so that neither the mouth nor the nose can touch the ground, and his mouth and throat should be carefully freed from mucus or other foreign matter by inserting a finger. The operator should kneel astride the patient's thighs, and facing his head. The palms of the operator's hands should be placed on the loins or the muscles of the small of the back, with the thumbs nearly touching each other, and with the fingers spread over the lower ribs. The operator should hold his arms straight, and should gradually swing his body

forward so that his weight is brought to bear upon the patient. This should take two or three seconds for an adult patient, and the pressure should be applied gradually as already explained. Sudden and violent application may cause internal injuries. The purpose of the operation is to raise the contents of the abdominal cavity, and to compress the lower part of the chest, thus forcing air out of the lungs. The operator should then immediately swing backward, thus removing the pressure. The lower chest walls will then expand from their own elasticity, and the organs of the abdominal tract will also tend to return to their normal position, so that air will be drawn into the lungs. After an interval of one and a half or two seconds the entire operation should be repeated, and the treatment should proceed in this way, until natural respiration occurs, or until it becomes certain that further efforts are useless. It will thus be seen that a complete resuscitation should be made every five seconds, or at the rate of twelve per minute. It is important that this rate of respiration should not be greatly exceeded, as might easily occur because of the excitement, and over-anxiety to aid the patient; and it is also important that the pressure be applied firmly and regularly, so that the natural act of breathing may be imitated as closely as possible.

"If there are any other persons about, one of them should be dispatched at once for a physician, and in the meantime artificial respiration should be continued without interruption until natural breathing is restored. If necessary this treatment should be continued for at least two hours with a victim of electrical shock, and respiration has been restored in drowning accidents after three or more hours of uninterrupted efforts. These facts should be remembered, because after working for half an hour or an hour without any sign of returning consciousness or natural respiration, the uninitiated operator might assume that further efforts would be useless, and this would be a great mistake. From the nature of the case there can be no authentic statistics as to the lives lost through premature cessation of artificial respiration, for the victims are gone and they cannot come back to testify or show that they would have revived if the treatment had been continued for

ten, twenty or forty minutes more. It is wisest to continue the efforts until a physician comes, unless his arrival is delayed for four or five hours.

"If several persons are present they may best render assistance by keeping well away from the patient, although one of them may advantageously loosen the victim's clothing, particularly about the throat and chest. Others may scour the neighborhood for warm blankets or hot water bottles, with which to protect and warm the patient's body and limbs; but nothing should be done to hamper the effective and regular work of the operator who is endeavoring to restore respiration. A cloth, saturated with aromatic spirits of ammonia (if this can be obtained easily) and held near the nose, is an excellent respiratory stimulant, but it is useful only in connection with artificial respiration. No liquids should be administered to the patient until he has fully recovered consciousness.

"The Sylvester method requires the patient to be laid on his back with a folded coat or some similar thing under his shoulders. In applying this method the tongue must be drawn out and held by a pair of tongue forceps, or gripped by the fingers by means of a dry cloth or towel, so that it cannot fall back into the throat and check the entrance of air into the lungs. The patient's arms are then moved up and down so that they alternately enlarge and compress the lung cavity, thus causing air to enter and leave the lungs. It is evident that two operators are necessary, one to hold the tongue and the other to manipulate the arms. Experience has shown that this method of artificial respiration quickly tires the operator, who is likely to give up from fatigue before it is certain that all further efforts are useless. It is advisable to study the subject of artificial respiration before the emergency occurs, and to take personal lessons in the art from a competent instructor rather than to learn how to proceed by reading books or articles about it. This advice is particularly applicable to the Sylvester method, the effectiveness of which depends largely upon the way in which the arms of the patient are moved.

"The relative merits of both of the foregoing methods have been set forth many times, and the opinions of various commissions and investigators are so conflicting that one is left in doubt as to their relative value. From the

results published the conclusion may be justified that the variation in tidal air-flow is due not so much to the superiority of one method over the other, as to the skill of the operator. The Schafer method is comparatively easy to learn and execute, and requires only one person to apply it, and for these reasons its use is increasing.

"As stated at the outset, the object of this article is to direct attention to simple methods of resuscitation—methods that can be applied on the spot without any auxiliary equipment. If a good mechanical device for resuscitation is available, it is desirable to use it instead of depending on the Sylvester or Schafer methods. The pulmotor, a device consisting of an oxygen tank, tubing, and simple controlling arrangements, is automatically operated by the pressure of the oxygen in the tank. The lungmotor is a hand operated device, by which either air or oxygen can be administered. Both of these machines are in general use, and they have proved their value many times by restoring persons who have been overcome by gas, smoke, or electricity, or by submersion under water."



Industrial Welfare Number of "The Modern Hospital."—The August number of *The Modern Hospital*, St. Louis and Chicago, is devoted to a symposium on welfare work among the industrial corporations of the country. There are editorials by those competent to write on this important subject, a great number of papers written by welfare directors in some of the most important industrial corporations, and an immense amount of statistics and figures and facts showing the huge volume of work that the corporations are doing to protect their employees against sickness, accidents, and discontent. The journal contains many illustrations of first-aid stations, emergency hospitals, and welfare departments of industrial plants, and many facts that should be of great help to those interested. Among the topics discussed are those of first aid, industrial nursing, lunches and diets for industrial employees, safety devices in factories, and athletic and social clubs for employees. The editors frankly state that they have been unable to obtain figures as to cost of welfare work in the industries, but a number of writers attempt to make deduc-

tions and draw conclusions from their experiences of the past few years.

The Modern Hospital divides welfare work into three phases:

1. To make employees healthy, comfortable, and happy, in order that they may achieve the highest efficiency in their work.

2. To help employees prepare for the day when they are prevented from being bread winners, so that dependents on them may be provided for in case of sickness or disability.

3. To provide entertainment, recreation, and interesting groupings, in order that the employees of the corporation may have mutual interests which will enhance their loyalty and team-work.

Some able writers have discussed the various features of welfare work for the different branches of industry, as, for instance, Dr. Thomas Darlington, former health commissioner of New York and medical director of the American Iron and Steel Institute, discusses the present scope of welfare work in the iron and steel industries. Dr. Samuel Lambert writes on provision for medical care under health insurance, and Dr. S. S. Goldwater, formerly health commissioner of New York, has an editorial on the conservation of health of industrial workers. Welfare work in the public utility corporations is discussed by Mr. H. H. Vreeland, general manager of the Interborough Rapid Transit Company, New York. Mr. James Prentiss Duncan discusses welfare work in the telephone and telegraph corporations. Mr. H. G. Kobick, manager of the employment department of the Commonwealth Edison Company, discusses welfare work in the electric lighting corporations. Mr. S. F. Moore discusses welfare work among the gas corporations. There are stories of welfare work in such department stores as Wanamaker, Macy's, Marshall Field's, and similar great concerns. Mr. G. A. Ranney, secretary, discusses welfare work of the International Harvester Company. Mrs. Anne Kendrick Walker discusses welfare work among the clothing and suit manufacturers. A representative of Armour & Company writes on the subject of welfare work in Packingtown, Chicago. Besides many more of these special papers, there is an epitome of welfare work in hundreds of the corporations of the country.

Perhaps the best feature of the industrial

number of *The Modern Hospital* is the attempt on the part of the editors to weed out those features of industrial welfare that they believe undesirable and to emphasize those that seem to best meet the present needs of the American public.



The Association of Government Labor Officials of the United States and Canada, comprising labor commissioners, industrial inspectors and experts on industrial hygiene, met in annual convention at Buffalo, during July.

A large part of the time of the convention was given over to the discussion of safety measures and the question of raising the health standard in mills, shops and factories.

One of the speakers stated that the state of Missouri appropriated, during 1915, \$600,000 for the protection of wild game and at the same session of the legislature provision was made for a fund of \$15,000 to see that the employees of the mines of the state were given adequate protection in the way of safety devices and sanitary measures.

The key note of the convention was contained in the address of the State Labor Commissioner of Missouri, John T. Fitzpatrick:

"Industrial preparedness means adequate and equitable provisions for the health, safety, welfare and well being of our toilers, whether they be in the mill, mine, factory, work shop, railroad or field. It means that our natural resources will provide conditions for the toiler permitting him to become proficient in the performance of an active citizenship, interested in the well being of others and in a good, stable, virile government."



Increase in Michigan Accidents.—Big increases over the first six months of the year 1915 are shown in the report of the Industrial Accident Board for the first six months of 1916.

The total number of accidents for the first half of 1915 is 6,219 while the last six months show 9,569. The total compensation paid in 1915 amounted to \$584,550, while this year it has been \$804,369.

"The large increase in the number of accidents," says Secretary Gilbert W. Dickson, in an explanation of the figures, "is directly due to the increased number of employees at work in the various industries of the state. The indus-

tries of the state vary in character and furnish a sufficiently broad field for the law of average to operate on, so that the fluctuation in the number of accidents from time to time directly represents the proportionate number of persons at work in the various industries."



Firms May Hire Physicians.—In the monthly bulletin of the Pennsylvania Manufacturers' Association, just issued, there is a lengthy discussion of the proposition of the physician in industry. As a direct consequence of this article it is likely that the matter of medical supervision in factories will be discussed thoroughly at the annual meeting of that organization.

Since the Workmen's Compensation Law became operative the employer has been responsible for the payment of the fees of the physician in the case of an accident to employees "in the course of their employment." They have the right to designate this physician and the step presented to them in the current bulletin carries that proposition a step forward.



Prosperity and Accidents.—According to the *Milwaukee* (Wis.) *Wisconsin*, prosperity, high wages and plenty of employment in Wisconsin industries has had a definite effect on the volume of work in the office of the industrial commission which administers the Workmen's Compensation Act and all other labor laws. Figures for June show nearly twice as many accidents as June of last year.

The commissioner's statisticians say that there has been an increase of 64 per cent. in the number of accidents reported in the first five months of 1916 as against the first five months of 1915. This abnormal increase is explained by the existing normal industrial conditions. Factories are working night and day, and in some cases three shifts are working where only one shift worked before the boom in war materials.

Employment of unskilled labor, neither speaking nor understanding English, is given as the direct cause for the increase in accidents.



Standardization of Safety Regulations.—The Committee on Safety and Sanitation of the American Foundrymen's Association met in Rochester during July and prepared safety

regulations which are to be standardized for all the states.

Mr. Victor T. Noonan, State Industrial Safety Director of Ohio, is chairman of this committee. The principal recommendations of the committee briefly are as follows:

"All workmen must report injuries promptly to their employer, particularly minor hurts, such as scratches and slight cuts.

"The use of peroxide for first-aid treatment is prohibited on the ground that it is not reliable. Iodine is to be used in its stead.

"The use of liquor by foundry workers during working hours is prohibited and it is to be discouraged outside of working hours. Employers and heads of departments are urged to set the example of sobriety to their employees.

"Workshop rules must be strictly enforced. Shop discipline is most necessary in accident prevention.

"Foremen in all foundries must take a personal interest in accident prevention and set an example of carefulness to their men.

"Employees should organize safety committees among their workmen and use the following educational methods—prize contests, suggestion boxes, bulletin boards, motion pictures and safety meetings. Seventy five per cent. of the accident reduction so far has been accomplished by educational work.

"All drinking cups should be abolished, and sanitary drinking fountains installed in their place."



Residence for Department Store Employees.—

The firm of Jordan, Marsh & Company of Boston has given over for the use of their employees a country home situated in Wenham, some twenty miles from the city.

The new venture is intended primarily for employees needing a change of air, and not as a country club. Employees of the store in need of rest or convalescing from illness may recuperate among the most pleasant surroundings.

Gratifying results have been obtained during the short time since the house has been thrown open. For those cases, however, of prolonged convalescence, Lyons Farm, Billerica, is still used by the firm.

Coke Oven Accidents in 1915.—Reports received from the operators of coke ovens show a gratifying decrease in the number of fatalities and injuries during the year 1915 as compared with 1913 and 1914. The number of men killed in 1915 was 38 as compared with 45 in 1914, and 46 in 1913. The total number of men reported employed for 1915 was 31,060 as compared with 22,313 in 1914. The fatality rate in 1914 was 2.02 per 1,000 while in 1915 it was 1.22. The injury rate in 1914 was 98.10 per 1,000 while in 1915 it was 91.82 per 1,000 men employed. Of the total number of non-fatal injuries, none were reported as causing permanent total disability, while 50 were reported as causing permanent partial disability. The report represents 248 plants or companies showing 55,112 ovens in operation as compared with 49,895 in 1914. Some companies rendered combined reports for several plants so the exact number of plants is not known. There were also reported 98 plants idle. The average number of days active in 1915 was 303 as compared with 286 in 1914, and 288 in 1913. Although the accident figures thus collected are not quite complete for the entire industry, yet they are sufficiently representative to point out some of the principal hazards of the industry.

The report gives for the first time separate accident data for beehive and by-product ovens and indicates a greater hazard for the latter than the former.—Albert H. Fay in *Safety Engineering*.



Pension Fund for Employees.—Swift & Company of Chicago announced in July that it had established a pension fund for its employees with a foundation of \$2,000,000. The fund, the accumulation of six years, will benefit employees of the company throughout the country. It is stated that more than 30,000 men and women are eligible to come under its provisions.

One of its features is that employees do not contribute to it, the company furnishing all the money necessary to pay pensions. In this connection, the company says it expects to be called upon to pay \$400,000 a year in addition to the income from the fund, in order to meet the demands. Pensions are limited to a minimum of \$240 and a maximum of \$5,000 a year. In Chicago alone 8,000 persons will come under the

plan as outlined. A pension board has been organized consisting of five members, who are officers or employees of Swift & Company.



Dormitories for Women Employees.—The Remington Arms Company of Bridgeport, Conn., have built and equipped for their female employees four large dormitories, each of sixty-nine rooms. These dormitories will be conducted on the plan of a hotel and will include many provisions for the comfort and convenience of their occupants.



Factory Athletic Director.—The Wagner Electric Manufacturing Company of St. Louis is to employ an athletic director for the 3,500 persons employed in its four plants. The company will employ an experienced athlete who will devote part of his time to factory work and part to athletics.

The athletic director will also be expected to instruct the plants' workers in hygiene and the care of the body.



A Good Record.—For the first six months of

this year the Pennsylvania Railroad System carried 92,380,184 passengers without killing one in a train accident. This rounds out a two-and-one-half years' record of similar safety, during which 453,952,298 passengers were carried. They rode in 3,000,000 trains for a total of over 10,000,000,000 miles.



The Aluminum Company of America has at the expense of \$15,000 built at New Kensington, Pa., a ball park for the use of its employees. At night the company employs the park in showing free moving pictures to employees of the company and their families.



According to the workmen's compensation report of Pennsylvania there are now in that state 22,900 persons who are receiving semi-monthly payment as a result of the enactment of the Workmen's Compensation Law.



A case of anthrax in an employee of a leather company has been reported from Camden, N. J. The employee is said to have contracted the disease while handling raw hide.

Personal Notes.

Dr. Henry Hanson has severed his connection with the State Board of Health of Florida and is now engaged in private laboratory work. Dr. E. G. Birge has succeeded Doctor Hanson and is in charge of the Central Laboratory of the State Health Department.



Dr. Arthur A. Brown and Dr. Francis A. Finnigan have been appointed district health officers of the Massachusetts State Department of Health.



The degree of doctor of science has been conferred on Dr. Ludvig Hektoen, director of the Memorial Institute for Infectious Diseases, Chicago, by the University of Wisconsin.



George W. Fuller, consulting engineer of New York City, has been awarded the Edward Longstreth medal of merit by the Franklin

Institute, Philadelphia, for his paper on "Biochemical and Engineering Aspects of Sanitary Water Supply." The paper, which was published in the *Journal* of the institute in July, 1915, was a comprehensive description of practical means of measuring the sanitary quality of water supplies.—*Exchange*.



James L. Tighe, consulting hydraulic engineer, of Holyoke, Mass., has been engaged by the board of public works to assist in estimating the value of the Springfield waterworks. Mr. Tighe was connected with the Holyoke engineering department for nineteen years, and resigned to engage in consulting practice about six years ago.—*Exchange*.



Arthur Lederer has resigned as chief chemist for the Sanitary District of Chicago to study the course for health officers at Harvard-Technology.

The International Health Commission of the Rockefeller Foundation announces the change of its name to International Health Board of the Rockefeller Foundation.



The following persons were elected to membership in the American Public Health Association, July 17:

Alfred Katz, 21 Besse Place, Springfield, Mass., Massachusetts State Board of Labor and Industry.

William W. Peter, Shanghai, China, Secretary, Joint Council on Public Health Education of the National Medical Association of China.

E. B. Johnson, Watertown, Mass., Agent, Board of Health.

William J. Graf, M. D., Cincinnati, Ohio, Physician and Surgeon.

Frank H. Stadtmueller, Elmwood, Conn.,

Town Health Officer, State Dairy and Food Commissioner.

Abram W. Harris, New York, N. Y., Secretary, Board of Education, Methodist Episcopal Church.

Charles Davison, M. D., Chicago, Ill., Surgeon.
William B. Palmer, Health Dept., Orange, N. J., Milk Inspector of the Oranges.

Edmund T. Perkins, M. A., C. E., Chicago, Ill., Consulting Engineer.

William A. Pusey, M. D., Chicago, Ill., Physician.

Albert Scott Gray, M. D., Chicago, Ill., Physician, Editor, Health Department, Chicago Daily News.

S. V. del Rosario, M. D., Manila P. I., Chief of the Division of Sanitation of the City of Manila, Philippine Health Service.

Frederick Epplen, M. D., Spokane, Wash., Physician.

Current Public Health Literature.

AMERICAN.

Boston Medical and Surgical Journal.

CLXXV. July 6.

The Menace of Syphilis of Today to the Family of Tomorrow. J. H. Blaisdell.

July 13.

Certain Occupations as Contributing Factors to Diseases of the Skin. Charles J. White.

July 20.

Epidemic Poliomyelitis. The Symptomatology and Diagnosis in the Acute Stages. F. R. Fraser.
Anatomic Form and Posture, Important Factors in the Treatment of Pulmonary Tuberculosis. J. E. Goldthwait.

The Teaching of Therapeutics as a Branch of Applied Physiology. F. H. McCrudden.

July 27.

Common Sense and Consumption. John B. Hawes, 2d.

Cleveland Medical Journal.

XV. June.

The Enzyme Theory of Life. Leonard T. Troland.

Engineering News, New York.

76. June 22.

Grit Chamber and Pump Station, Albany Sewage Works. I. John H. Gregory.

June 29.

Proper Methods of Testing Water-Work's Pumps. L. A. Day.
Grit Chamber and Pump Station, Albany Sewage Works. II. John H. Gregory.

July 15.

Kansas Experience in Running Small Sewage Works. F. M. Veatch.

July 20

Air-Diffuser Experiences with Activated Sludge Tanks (Symposium).

Interstate Medical Journal, St. Louis, Mo.

XVIII. July.

Sputum Cultures with Subsequent Complement Fixation Control. W. W. Williams and Ward Burdick.
The Report of Twelve Cases of Pellagra and Its Relation to Mental Disease. Mary O'Malley.

Journal of the American Medical Association, Chicago.

LXVII. July 8.

Standards for Determining the Suitability of Patients for Admission to a Free Dispensary. Borden S. Veeder.

A Critical Analysis of Out-Patient Work from the Point of View of Efficiency. Lovell Langstroth.
Immunity Conferred by the Transfer of Immune and Sensitized Serums. H. Sewell, W. C. Mitchell, C. Powell.

July 22.

The Nature, Manner of Conveyance and Means of Prevention of Infantile Paralysis. Simon Flexner.

Journal of Bacteriology, Baltimore.

I. July.

Biological Variations of Bacteria. I. M. R. Smirnow.
A New Culture Medium for the Tubercle Bacillus. W. W. Williams and Ward Burdick.

Bacillus Abortus (Bang) as an Etiological Factor in Infectious Abortion in Swine. E. S. Good and W. V. Smith.

The Relation of Protozoa to Certain Groups of Soil Bacteria. T. L. Hills.

A Study of the Boas-Oppler Bacillus. P. G. Heine- man and E. E. Ecker.

A Contribution to the Bacteriology of Silage. J. M. Sherman.

Journal of Experimental Medicine, Baltimore.

XXIV. July.

- Immunity Factors in Pneumococcus Infection in the Dog. C. G. Bull.
 Further Observations on the Agglutination of Bacteria in Vivo. C. G. Bull.
 The Agglutinability of Blood and Agar Strains of Typhoid Bacilli. C. G. Bull and I. W. Pritchett.
 A Final Report on the Cultivation of the Tubercle Bacillus from the Sputum by the Method of Petroff. R. A. Keilty.
 Variations in the Pneumococcus Induced by Growth in Immune Serum. Laura M. Stryker.
 The Conditions and Characters of the Immunity Produced in the Guinea Pig by Instillation of Horse Serum into the Nose. H. Sewall and C. Powell.

Journal of Infectious Diseases, Chicago.

19. July.

- A Study of Various Methods for Determining the Virulence of Diphtheria Bacilli. J. A. Kolmer and E. L. Moskage.
 A Study in Acid Production by Diphtheria Bacilli. E. L. Moskage and J. A. Kolmer.
 The Relation of the Carbohydrate-Splitting Ferments to the Soluble Toxins of Diphtheria Bacilli. J. A. Kolmer and E. L. Moskage.
 The Protein-Sparing Action of Utilizable Carbohydrates in Cultures of Certain Sugar-Fermenting Organisms. H. M. Jones.
 The Antigenic Value of Spirochaeta Hyos in Complement Fixation Tests on Hog Cholera Sera. W. E. King and R. H. Drake.
 Antibodies after Antityphoid Inoculation. Katherine Howell.
 The Effect of Benzene on the Production of Antibodies. Ludvig Hektoen.
 The Time Relation of the Infiltrating Cells in Acute Anterior Poliomyelitis. A. E. Taft.
 Yeasts, Probably Pathogenic, in Throat Cultures. A. L. Grover.
 Observations on Phagocytosis and Leukocytic Activity in Diphtheria Carriers. Ruth Tunnichliff.

Medical Times, New York.

XLIV. July.

- A Prohibition Era—Is it Coming and Should We Welcome It? O. W. Ehrhorn.
 The Pathology of Syphilis (concluded). F. E. Gardner.
 A New View of Alcoholic Degeneration. T. D. Crothers.
 The Present Scope of Medical Jurisprudence. Theodore Sutru.

Modern Hospital, St. Louis.

VII. July.

- Nature, Value and Necessity of Team-Work in a Hospital. C. H. Mayo.
 Safeguarding the Hospital's Most Valuable Food—Milk. C. E. North.
 The Small Community Hospital—Its Finances. J. A. Hornsby.
 The Community's Obligation for the Care of Its Indigent Sick and Injured. F. S. Bunn.

Northwest Medicine.

XV. July.

- The Rational Treatment of Tuberculosis. A. M. Kinney.
 Government Control of Medicine and the Prevention of Quackery. Edgar L. White.

Public Health Journal, Toronto.

VII. July.

- Alcohol from the Public Health Standpoint. J. W. S. McCullough.

- The Attitude of the Psychiatrist toward Alcoholism as a Cause of Insanity. C. K. Clarke.
 The Royal Institute of Public Health—A Historical Survey. A. Corbett-Smith.
 The Mother in Industry. John Martin.

Public Health Nurse Quarterly, Cleveland.

VIII. July.

- Public Health Nursing—A Municipal Duty. C. E. Terry.
 Municipal Nursing—Some of Its Problems. Margaret F. Sirch and Edna L. Hedenberg.
 How Public Health Nurses Can Aid a State Department of Health to Extend Its Program of Health Conservation. R. G. Paterson.
 Health Insurance and Public Health Nursing. Olga S. Halsey.
 Standardization of Financial Statements for Visiting Nurse Associations. Lee K. Frankel.
 Relation of Overhead to Staff Expenses. Anna M. Huber.
 A Financial Program which Includes and Anticipates Public Subsidy. Mrs. J. W. Cunningham.
 Public Health Nursing in Rural Districts. Mrs. W. N. Hutt.
 Rural Tuberculosis Nursing. Elizabeth Leenhauts.
 The Training School's Responsibility in Public Health Nursing Education. Katherine Tucker.
 Eighteen Months' Field and Dispensary Work with Syphilis. Margaret Tupper.
 The Mental Hygiene Movement and Preventive Measures. Elnora Thomson.
 A Series of Talks on Public Health Nursing. Mary Beard.

Safety Engineering, New York.

XXXII. July.

- Personal Hazards. F. H. Elam.
 The A, B, C, of "Safety First"—Always Be Careful. Fred Koening.
 Chemical Paper Making—The Process, Hazards and Precautions to Be Observed. R. L. Morrow.
 Elevator Hazards and their Elimination. R. W. Hicks, Jr.
 United States Steel Corporation's Work in Accident Prevention. C. L. Close.

Southern Medicine, Birmingham.

IX. July.

- Common Sense and the Fever Thermometer v. the Stethoscope and the Microscope in the Diagnosis of Early Pulmonary Tuberculosis. S. E. Thompson.
 Rest and Exercise in Tuberculosis. Thompson Frazer.
 Health Conservation through Life Insurance Companies. J. L. Davis.
 What Life Insurance Companies Can Do for the Betterment of the Public Health. M. M. Smith.
 The Relation of Insurance Medicine and Periodical Health Tests to General Practice. W. O. Pauli.

Trained Nurse, New York.

LVII. July.

- What is Meant by Hospital Efficiency and Some of the Factors Which Are Often Responsible for Lack of Efficiency. Winford H. Smith.
 Practical Points in Mental Nursing for the General Nurse. H. W. Keatley.
 Occupational Therapy and the War. G. F. Barton.

August.

- Public Health Nursing and Tuberculosis. Otto R. Eichel.
 Practical Experience in an Epidemic of Typhoid. Anna L. Smith.
 An Essay on Personal Hygiene. M. G. Bellamy.

United States Public Health Reports.

XXXI. *June 30.*
Directory of City Health Officers of Cities Having a Population of over 10,000 in 1910.

July 7.
Pork and Trichinae.
Smallpox in Porto Rico in 1916. W. W. King.
Public Health Administration in Nebraska. Carroll Fox.

July 14.
Poliomyelitis—What Is Known of Its Cause and Modes of Transmission. Wade H. Frost.

July 21.
Hay Fever and Its Prevention. W. Scheppegegrell.
Health Insurance. Report of the Standing Committee Adopted by the Conference of State and Territorial Health Authorities with the U. S. P. H. Service.

BRITISH EMPIRE.**British Medical Journal, London.**

I. May 27. No. 2891.
Louse Problem on the Western Front. A. D. Peacock.
Simple and Inexpensive Methods for Fermentation Tests and for Obtaining Cultures of Anaerobes. J. M. Beattie.

June 3.
Louse Problem on the Western Front. A. D. Peacock.
Best Methods of Destroying Lice and Other Body Vermin. J. P. Kinloch.

June 10.
Spirochaeta Eurygyrata, as Found in Human Feces. H. B. Fantham.

Journal of State Medicine, London.

XXIV. July.
The Rapid Production of Antidysenteric and Antimeningococcic Sera. Simon Flexner.
The Care of Children under School Age. A. S. M. Macgregor.

Lancet, London.

CXCI. June 24.
On the Agglutination Reaction of the Bacilli of the Typhoid-Dysentery Group with Normal Sera. T. R. Ritchie.
Annual Report for 1914 of the Registrar-General. J. F. W. Tatham.

July 1.
The Prevention and Treatment of Cholera. S. M. Cox.
On a Substitute for Peptone and a Standard Nutrient Medium for Bacteriological Purposes. Report to the Medical Research Committee. S. W. Cole and H. Onslow.
Kala-azar in Soldiers Returning from Malta. G. R. Ward.

Medical Officer, London.

XVI. June 17.
Illegitimacy in Relation to Infant Mortality. T. W. Taylor Barlow.

June 24.
Meat Diet in Relation to Health.
The Maintenance of the Standard of Municipal Sanitation during the Continuance of War Conditions. James Wheatley.

July 1.
The Laboratory Diagnosis of Cancer. Harvey R. Gaylord.

July 8.
Flies and Refuse Heaps. W. H. Symons.

Public Health, London.

XXIX. July.
The History of the Birth and Death Rates in England and Wales from 1570 to the Present Time. John Brownlee.
Some Points in Connection with Scarlet Fever. L. J. Milne.
Smells or Effluvia Considered from the Chemical, Physical and Physiological Points of View. M. Young.
Imported Egg Yolk and Other Egg Products Examined at the Wharves in the City of London. A Report to the Sanitary Committee of the Corporation of London by W. J. Howarth.

Tropical Diseases Bulletin, London.

7. June 30. Sanitation Number.
Disease Prevention: Malaria, Plague, Typhoid, Beriberi, Vaccination, Food, Water.
Sanitary Organization: Cause and Effect; the Sanitarian and Finance; Night Soil Conservancy and Education.
Sanitary Rulings: Protection of Milk in Four Indian Cities; the Uganda Township Ordinance; Factories.
Treatment of Waste: The Economics of Conservancy; the Economy of Waste.
Sanitary Works: Irrigation and Malaria; Influence of Anti-Malarial Works; Double Domestic Water Supplies; Floors; Irrigation and Drainage; Rural Water Supplies in the Tropics.

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No. 9

SIXTY YEARS OF THE PROVIDENCE HEALTH DEPARTMENT

CHARLES V. CHAPIN, M. D.,
Superintendent of Health, Providence, R. I.

Read before the Massachusetts Association of Boards of Health, Providence, R. I., July 27, 1916.

THE Health Department of Providence was formally organized on July 7, 1856, by the appointment of Dr. Edwin M. Snow as Superintendent of Health and City Registrar. Doctor Snow remained in office until succeeded by the writer.

It is true that Doctor Snow was appointed City Registrar on July 23, 1856, and also "medical adviser" to the Board of Health (Mayor and Board of Aldermen), but it was not until the May session of the Legislature in 1856 that the city was authorized by law to appoint a health officer and determine his duties and it was under this act that the appointment was made on July 7 and rules adopted.

The immediate cause of the organization of the department was an outbreak of cholera which occurred in 1854 and which was investigated by Doctor Snow who made a report thereon to the Providence Medical Association and which was transmitted by it to the Mayor. There had been an outbreak of cholera in 1832 and in

1849. The permanent organization of the department was the result of these epidemics.

Doctor Snow presented his first annual report in July, 1857, and though he remained in office until 1884 never presented another, for, he said, there was little use in doing so until the recommendations in the first report had been carried out. Among the important measures recommended by Doctor Snow were a municipal water supply, a system of sewers, the ultimate treatment of the sewage and disposal at Field's Point, the removal of privy vaults and an adequate housing law. City water was not introduced until 1871. Sewers were begun a few years later, the sewage works were constructed in 1901 and the general order for the abolition of privies was passed in 1892. The housing question is now (1916) still being actively discussed.

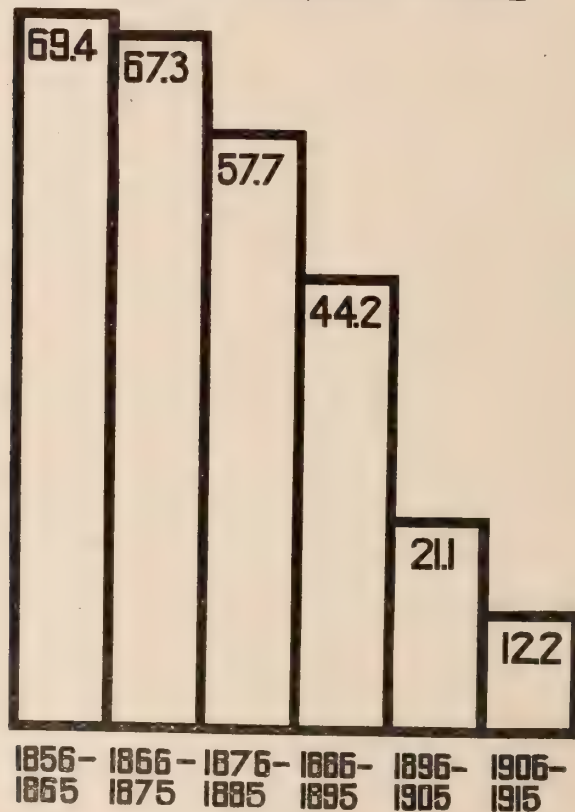
It may not be amiss at this time to inquire what changes have taken place in the prevalence of disease

during the past sixty years and in what measure these are probably due to efforts made directly for their control.

The earliest efforts were made for the restriction of the diseases spread by human excrement, namely cholera, typhoid fever, diarrhea and dysentery. Progress in sewer construction, house drainage, water supply and other things promoting cleanliness was slow in Providence, but the improvements have finally been made. Cholera only appeared once after the health department was organized, in 1866, and

the mortality was less than one-tenth what it was in 1854. The reduction in the mortality from typhoid fever and diarrheal and dysenteric diseases is shown by the accompanying diagrams. Perhaps the improvement is more clearly brought out by the statement that if the earlier rates had prevailed there would have been in 1915 about 175 deaths from typhoid fever instead of 21. Moreover of the 21 deaths in 1915, 6 were of non-residents dying in our hospitals and this means of swelling the death-rate did not

TYPHOID FEVER RATE PER 100000 LIVING

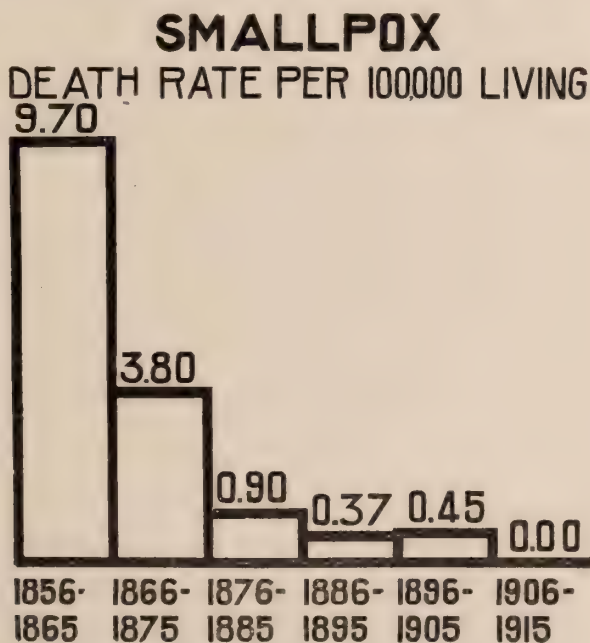


exist sixty years ago. If the diarrheal rate of the first decade had persisted there would have been 630 deaths in 1915 instead of 175.

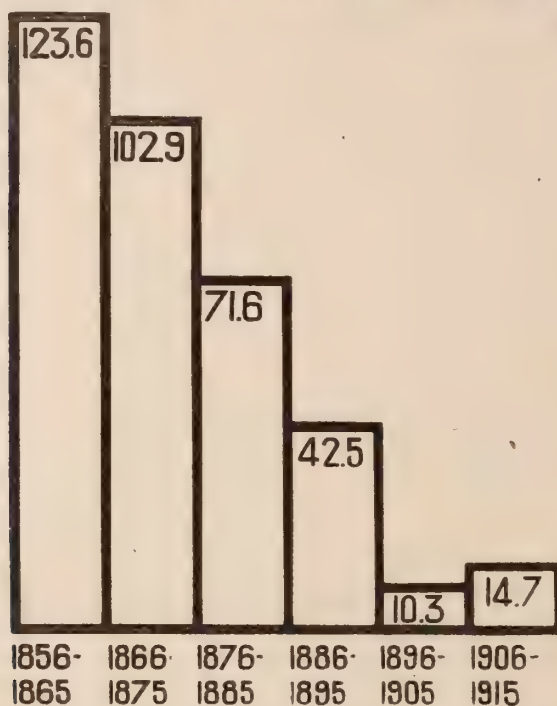
The characteristics of the second period of public health activity were the control of the directly contagious diseases by isolation, disinfection, vaccination and the like. The disease against which these measures were first energetically carried out was smallpox. The results are well shown in the diagram. This diagram must not, however, be compared with the other diagrams as it is drawn on a scale eight times larger than the scarlet fever diagram. There have been no deaths from this disease and only 39 cases in fifteen years;

Scarlet fever has shown a greater decrease than any other of the contagious diseases except smallpox. A

part of this decrease is due to the fact that there is much less of the severe type of the disease than formerly. There is reason to believe that sixty years ago scarlet fever was usually a severe and dangerous disease. The tradition of those days causes it to be dreaded more than some diseases of greater danger. Outbreaks of the former fatal type do occur now but they are less frequent and shorter than formerly. It was freedom from such an outbreak during the decade 1896-1905 that gave the exceptional small number of deaths in those years. An outbreak of the severe type lasting about six months in the winter of 1906-7 was the cause of the higher mortality in that decade. There is reason to believe that isolation has not only reduced the prevalence of the disease but I feel very certain that it



SCARLET FEVER DEATH RATE PER 100,000 LIVING

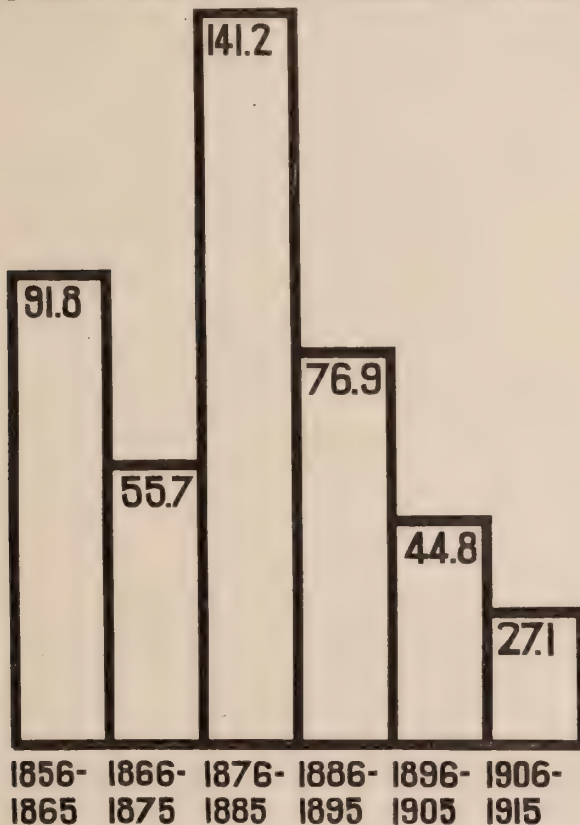


has also decreased its severity. It is highly probable that the same thing has taken place in smallpox. In both diseases the severe cases are easily recognized, and now-a-days are pretty certain to be well isolated. In this way the severe type has little chance to spread. The mild cases, on the other hand, often escape discovery and go about spreading the disease. Modern methods of isolation in scarlet fever and smallpox should be credited both with decreasing the number of cases and also with reducing the severity of the disease.

In former years a great deal of diphtheria was reported as croup so that the death-rates from these two

diseases have been combined in the diagram. Diphtheria increased in Providence rapidly until 1877. It seems likely that a new and severe strain of the disease was introduced from Europe in 1858. The contagious nature was not fully recognized, at first, and, as late as the great outbreak in 1877, it was believed by many to arise *de novo* in filth. It was not until after this that isolation began to be generally practised. While isolation has probably tended to decrease the prevalence of the disease the most important factor in reducing the death-rate has undoubtedly been the use of antitoxin and the intubation of the laryngeal cases. A great majority

DIPHTHERIA & CROUP DEATH RATE PER 100000 LIVING



of the cases requiring this procedure are now sent to the City Hospital. The diagram illustrates in a graphic manner the improvement which has taken place.

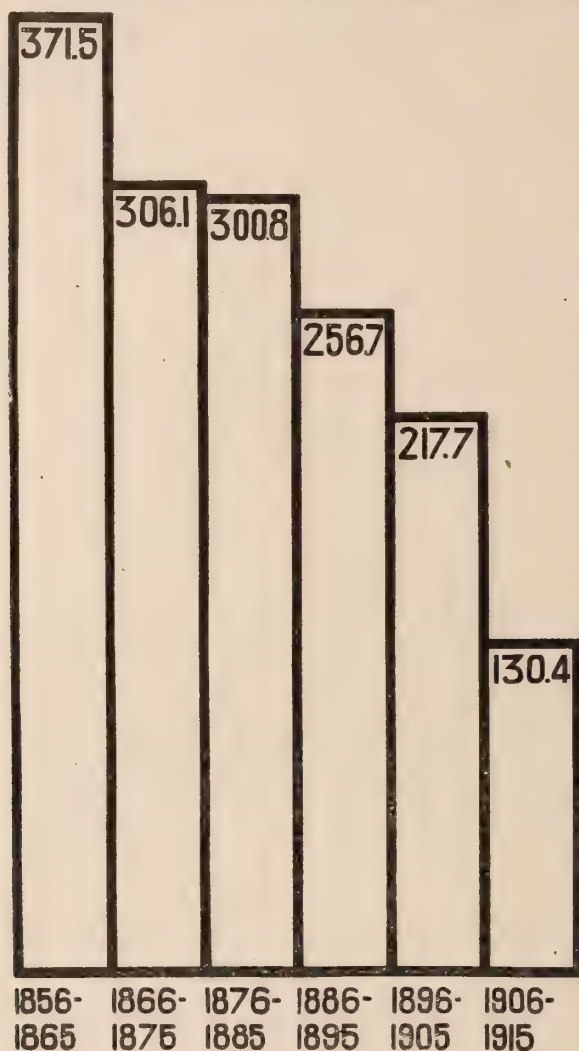
The third phase of public health activity, the education and direction of the individual, often accompanied by medical treatment, has only received general attention during the present century. The principal lines of activity so far have been the control of tuberculosis, the prevention of infant mortality and the supervision of school

children. The results of the latter cannot as yet be shown statistically.

The decrease in pulmonary tuberculosis has been most remarkable. This disease though contagious, is so chronic that it cannot be controlled by ordinary methods of isolation, yet it is far less prevalent than formerly. It is almost certain that this decrease has not been due to any one thing but is dependent upon a variety of causes. Tuberculosis is especially a disease of poverty. It is not unlikely that a large part of the decrease has been due

PULMONARY TUBERCULOSIS

DEATH RATE PER 100,000 LIVING



to the great improvement in the material well-being of the people dependent on the scientific discoveries and remarkable industrial development of the last half of the nineteenth century. Those most competent to judge consider that modern restrictive measures

deserve a large share of the credit. These are the sanatorium, the hospital, the preventorium, the dispensary and, last but not least, the nurse. It is doubtless due to the influence of these agencies that the tuberculosis death-rate after having declined from 378

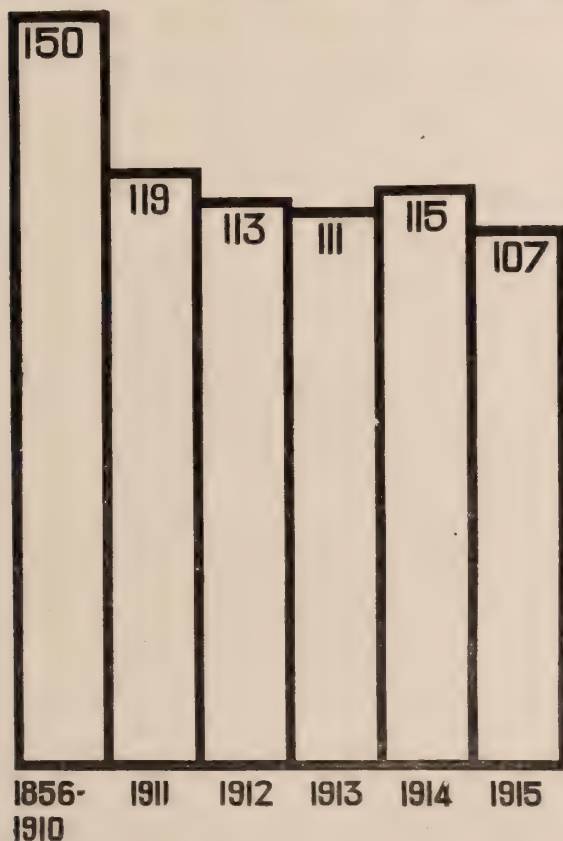
in 1856-65 to 143 in 1906-10 declined to 118 in 1911-15.

The infantile death-rate in Providence probably did not vary very much for fifty years. The apparent increase in the last years of the nineteenth century was probably due to less complete registration of births at that period. It was not until the last five or six years that the nurses, the welfare stations, the clinics, the super-

vision of boarding houses and other agencies of the kind began to make themselves felt. These efforts directed to the individual child, have, in Providence, as elsewhere, caused an immediate decrease in the number of infant deaths as is indicated by the accompanying diagram in which the recent improvement is shown by giving the last five years separately.

As was suggested in the preceding

INFANT MORTALITY DEATHS PER 1000 CHILDREN BORN



paragraphs, a decided change has taken place within the last few years in the methods and purposes of public health work. In fact there have been three stages in the evolution of modern preventive medicine.

In the first period attention was given almost exclusively to the environment and almost not at all to the individual. This was the period toward the middle of the nineteenth century when typhoid fever, dysentery and diarrhea were the prevailing diseases and epidemic after epidemic of cholera overspread the world. There was no sewerage and human filth abounded. There were few public water supplies and these were polluted. Wells were infected. Water in towns was scarce and personal cleanliness impossible for the poor. The first effort was toward municipal cleanliness. Pure water was demanded. Sewers were built. The filth borne diseases above mentioned have been banished from most of our cities or reduced to a minimum. Unfortunately the success of these measures appealed to many reformers who unthinkingly assumed that, if a little cleanliness cut down a few diseases, it would be possible by making our cities into spotless towns, to exterminate all infection. The untrained health officer, and few were trained in those days, accepted the suggestion, and became little more than a chaser of bad smells. To abate some nuisances and to remove some kinds of filth does save lives but with few exceptions dirt and odors have no relation to disease. The folly of making municipal house cleaning the chief work of

the health department was referred to in my report for 1884 where it was urged that more attention be given to the control of diseases which spread by contact from person to person. The modern, scientific, viewpoint is well illustrated by McNutt's authoritative *Manual for Health Officers* which, of 633 pages, devotes 36 to nuisances including the removal of wastes and fly and mosquito suppression. We have learned that it is infinitely more important to remove adenoids from the backward child than it is to remove ashes from the back yard, to fill decayed teeth than it is to fill sunken lots, to discover incipient tuberculosis in a wage-earner than it is to discover a pin hole opening in the plumbing.

In the second stage of public sanitation attention was given to those diseases due, not to filth, but to contagion by contact. Smallpox, scarlet fever, diphtheria and typhus fever were most dreaded. The isolation of the sick was the chief weapon, except for smallpox, in which disease the first place must be given to vaccination. During the last quarter of the last century health officers gave most of their attention to building isolation hospitals, or securing isolation in the home. Typhus fever is now a rare disease and the deaths from smallpox, diphtheria and scarlet fever are scarcely one-tenth as numerous as thirty or forty years ago. Smallpox might easily have been exterminated, here, as in Germany, if it were not for the strange opposition to vaccination. Doubtless much can still be done to improve isolation, but to get rid of the

remainder of these diseases new methods must be devised.

With the beginning of the twentieth century came a broader outlook in preventive medicine and a different viewpoint, but old methods are not discredited. We must maintain our sewers, protect our water supplies and isolate our sick, or the old conditions will return. In addition, it is seen that the efforts of the health officer must be largely personal. Attention is no longer focused on the small circle of contagious diseases that have been mentioned. It is realized that it is just as important to save a life from tuberculosis as it is from small-pox. A baby saved from improper feeding is just as much an asset as if it was saved from diphtheria. Many forms of disability are a greater burden on the community than is sickness and death. To prevent a child from becoming deaf, or blind, or crippled is as useful as to prevent it from having scarlet fever.

The education of the individual has become a most important duty. The consumptive must be taught such habits of life that he may have a fighting chance. He and his family must be taught the modes of infection and how to combat them. The mother must be instructed how to feed her baby. Parents must be taught that the earache due to adenoids may result in permanent deafness. The tuberculosis nurse, the baby nurse and the school nurse are becoming most important means for carrying on this personal work. Much of the campaign carried on by the health department encroaches on what has been

considered the domain of the practicing physician, as the advice to the mother on the care of infants, the directions to the consumptive, vaccination, the injection of antitoxin and other sera, the examination of the eyes of school children, the establishment of clinics for tuberculosis and the treatment of syphilis. But these are the things that count. The death-rate from tuberculosis is falling, the fatality of diphtheria is now eight per cent, where it was formerly forty, 200 babies' lives are saved every year in Providence, in hundreds of school children the eyesight has been improved, deafness warded off, tuberculosis detected, crippling prevented, teeth cared for, and the feeble and poorly nourished made strong. Much less is now being done than should be. The death-rate for babies is higher than in New York and Boston. Scores of poor consumptives are still left to die in crowded tenements. The poor who are sick from other diseases in their homes have little medical care. The proper medical care of the sick poor in their homes has hitherto received little attention in this country. Most of our cities are fairly well supplied with hospitals, though the demand for more ward space is constantly increasing. Usually dispensaries for outpatients are fairly ample and are sometimes abused, but nothing is done for the poor patient unable to go to the dispensary but who might be as well, if not better, cared for at home than in the hospital. This is particularly important in the case of babies and children. The very best medical treatment is needed in the home. For

the poor this should be furnished by the city. This was begun in Providence in a small way and must grow.

If the city of Providence intends to hold a place among the most progressive American cities in effective lines of health work it must provide for carrying on such activities as are here suggested. Health work today is very different from what it was sixty years ago. Its sphere will constantly widen in the future. It is for the citizens to decide whether use will be made of modern methods of improving the public health, or whether babies and children will sicken and die, and young men and young women in the prime of life will work with impaired vigor because the municipality fails to do all it can to help them to live right. Among the needs of Providence are:

1. An enlarged service for the protection of baby life. Our death-rate is still higher than in some of the largest cities. The health department needs several more nurses. The welfare stations under private agencies are doing good work. So are the clinics for sick babies. We need others. The maintenance of these may have to be undertaken by the city. The clinics and welfare stations may be expected to develop into permanent local "health centers" under the health department as in New York, Buffalo, Cleveland and other places.

It is earnestly hoped that prenatal work may be organized here as has been so successfully done elsewhere.

2. The milk supply should be improved. There should be a bacterial standard. All milk should be

pasteurized unless from tuberculin tested cows. Pasteurization should be closely supervised. Only bottled milk should be sold in stores.

3. The medical inspection of school children and particularly the work of the nurses should be extended. All authorities are agreed that there should be one nurse for each 2,000 school children. This would mean sixteen nurses. At present there are nine. There should be eight school physicians. At present there are four.

4. To supplement the work of the dental inspector dental dispensaries for children are needed. Decayed, aching and defective teeth interfere with school work. The best medical authorities now believe that many disorders and much poor health are due to infection received through decayed and diseased teeth. To preserve the teeth is not only a dental problem, it is a health problem. It can only be solved by organized effort. Many American cities maintain dental clinics. Providence should do so. It would be best to begin with the children in the 1B and 1A grades. Probably four clinics every morning in the week would suffice for this.

5. The medical service for the care of the sick poor in their homes begun by this department should be maintained and enlarged. Five thousand dollars is needed next year. The various charitable organizations have come to depend on these physicians to supplement their work.

6. Most health departments are now employing nurses to visit cases of contagious disease, sometimes to nurse and always to show how to iso-

late and disinfect. Providence was the first city to abandon the practice of fumigation, an example which has now been followed by New York, Boston and other cities. Providence, however, was not the first city to employ a nurse to teach *real disinfection* all through the disease. We have one nurse now and need another, or perhaps two more.

7. The chief means for the direct control of tuberculosis have already been touched upon. The state has a sanatorium which at present seems to be sufficient for the incipient cases for which it was designed. The city maintains a ward for advanced cases at this hospital, as does St. Joseph's hospital, and the state is now building one at Wallum Lake. Doubtless the latter when completed will soon be filled and the city will have to build another ward at this hospital. The several dispensaries are, perhaps, for the time, sufficient to meet the needs, but one or two more will in time be necessary. It is especially important that the one recently established by the City Hospital at the Delaine Street Nursery be continued and probably correlated with a general medical

dispensary. The visiting nurse is perhaps the chief factor in prevention and four have been employed by the District Nursing Association. These are not enough and very likely three or four more are needed. If the Nursing Association is unable to finance these the city will have to, or else Providence will be obliged to take a very subordinate position in the nation-wide efforts which are being made to control this disease. Among other useful agencies are the preventorium maintained by the Providence League for the Suppression of Tuberculosis and the open air schools conducted by the city.

It will doubtless be objected that all this is socialism. So it is, and so is our system of public education, and our city water supply and our municipal pier and garbage collection and the proposed removal of ashes. It will also be objected that to carry out the plans proposed costs money and so it does. The health department of New York has as its motto "Public Health is Purchasable." It is the business of the health department to show how it can be purchased. It is for the citizens to determine whether they wish to purchase it.

RELATIVE VALUES IN PUBLIC HEALTH WORK.

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Read before the Massachusetts Association of Boards of Health, Providence, R. I., July 27, 1916.

ABOUT 1,400,000 persons die in continental United States each year. Probably a fourth or a third of these die from preventable causes. In addition, it is asserted, and recent sickness surveys seem to support the claim, that two or three per cent. of our population are, at any one time, disabled through sickness. Then there is the larger number of persons afflicted with illnesses not serious enough to disable but which cause loss of comfort and efficiency.

The task of preventing these vast amounts of sickness and death, so far as is possible, is delegated by the public to its health authorities. The latter must decide what parts of the losses are preventable, and must determine how the greatest return in prevention can be obtained with the money available. This is the problem of relative values in public health work.

If unlimited funds were at the disposal of health departments the problem of relative values would be one of merely theoretical interest. The administrator would need only to institute all the activities that seemed likely to exert a beneficial effect, and at the close of the year prepare a table of expenditures with regard to the several activities. This list would indicate the relative value attached to different activities when no stone is

left unturned, but would be a tabulation of purely academic interest.

Quite different is the situation actually confronting health officials. With the scanty funds now at their disposal, and the great variation in effectiveness of different activities, the most careful discrimination must be exercised in making up the department's program. A bad distribution of funds means lives lost, and the responsibility, a heavy one, falls on the administrative official. The problem is rendered the more difficult by the lack of accurate data as to costs and results. The practical importance of an accurate appreciation of relative values can hardly be overemphasized. Professor Whipple, in discussing the subject says, "This is one of the greatest questions that a sanitarian can consider. It is today the most important of all hygienic problems because it comprehends all others."*

THE FIELD OF PREVENTION.

In attempting to determine values it seems reasonable to take vital statistics as the point of departure. Our death and sickness records suggest the opportunities that lie before us, and it is by these figures that we must judge the efficacy of our endeavors. Our

* Whipple, G. C.: "How to Determine Relative Values in Sanitation"; *American City*, X, 5, p. 427.

TABLE 1.
PREVENTABLE DEATHS IN ALL REGISTRATION CITIES, 1913.

Cause of death.	Number of deaths.	Per cent. of preventable deaths.
Infectious Diseases	149,600	99 0
Tuberculosis—all forms:	56,624	37 5
Lungs	48,733	
Meningitis	3,861	
Other forms	4,030	
Diarrhea and enteritis (under 2)	30,244	20 0
Bronchopneumonia	21,091	14 0
Common contagious diseases	19,058	12 6
Measles	4,517	
Scarlet fever	3,854	
Whooping-cough	3,047	
Diphtheria and croup	7,640	
Typhoid fever	5,627	3 7
Syphilis—total	4,902	3 2
Syphilis	3,422	
Locomotor ataxia	1,020	
Softening of the brain	460	
Influenza	3,000	2 0
Puerperal fever	2,825	1 9
Gonococcus infection	191	0 1
Other infectious diseases	6,038	4 0
Erysipelas	1,599	
Dysentery	1,212	
Tetanus	876	
Cerebrospinal fever	834	
Malaria	644	
Infantile paralysis	392	
Cholera nostras	140	
"Other epidemic diseases"	124	
Rabies	67	
Smallpox	44	
Intestinal parasites	30	
Mycoses	24	
Hyatid tumor of liver	13	
Anthrax	12	
Ankylostomiasis	10	
Glanders	7	
Leprosy	4	
Typhus fever	3	
Relapsing fever	2	
Plague	1	
Nutritional Diseases	1,097	0 7
Pellagra	702	
Rickets	335	
Scurvy	53	
Beriberi	7	
Poisoning by Food	329	0 2
Industrial Poisonings	124	0 1
Lead poisoning	120	
Other chronic occupational poisonings	4	
Total—preventable deaths	151,150	100 00

sickness records are, unfortunately, so fragmentary as to be of little practical value, while our death records are reliable for only two thirds of the country. Let us turn, however, to the mortality statistics for 1913, and seek to discover the opportunities for prevention.

The registration cities of the country represented in 1913 a population of 34,230,283, or 35 per cent. of the total. In Table 1 an attempt is made to show the preventable deaths occurring in these cities. This table is intended to include all infectious diseases; certain nutritional diseases, such as beriberi and pellagra; industrial poisonings; and food poisonings. Certain of the infectious diseases included, such as puerperal fever, will seem novel in connection with health department activities. They are included on the theory that being infectious, they are preventable; that ultimately we may come to prevent them; and that the health department is the only governmental agency whose business it is to prevent them. The numbers of deaths from these diseases are, furthermore, relatively small.

There are conspicuous omissions from the list. Cancer is a striking example. No one doubts that many deaths from cancer may be avoided through early operation, and allowance must be made for this disease in making up relative values; however, it has seemed better to omit cancer from this list, and to lump it in with the degenerative diseases of middle age. Allowance will be made for this group of diseases under the heading of health education. Again, the list disregards

the great group Diseases of Early Infancy, from which something certainly can be saved. In addition, bronchopneumonia is included entire and placed in the infant group, while all other forms of pneumonia are omitted. Finally, the list seriously understates the losses caused by the venereal diseases, making no effort to include the deaths that may be due to syphilis but that are registered under diseases of the arteries and other organs, although it does include deaths from locomotor ataxia and softening of the brain. The list also disregards deaths from such causes as salpingitis—deaths in which gonorrhea may play a part. An attempt to make due allowance for these inclusions and omissions will be made later in the paper.

It is worthy of note that this list of preventable deaths, although conservative, totals 151,150, or 29 per cent. of the deaths from all causes.

DAMAGE DONE AS A CRITERION.

When we come to compare the different diseases in the list it becomes evident that relative importance cannot be tested adequately by any single criterion, but that several of fairly equal importance must be considered. One of the most obvious tests is the number of deaths caused by each disease. On this basis tuberculosis, responsible for 56,624, or 37.5 per cent. of the whole preventable list, is the most important. Second in importance comes diarrhea and enteritis among children under two, responsible for 30,244, or 20.0 per cent. Next comes bronchopneumonia, with

14.0 per cent.; followed closely by the four common contagious diseases of children—diphtheria, scarlet fever, whooping-cough, and measles, responsible as a group for 12.6 per cent of the deaths.

But the number of deaths is not an adequate measure of the damage done. For one thing, it fails to take account of non-fatal illness. Perhaps the extreme example of this failure is gonorrhea. In the table this disease is represented by only 191 deaths, about 0.1 of one per cent. of the total; yet we know that gonorrhea is one of the commonest of communicable diseases, and that its public health importance is far in excess of the figure just given. Other examples of diseases with low fatality rates, and whose importance is inadequately represented by the death test are hookworm and malaria. In measuring the loss due to any preventable disease we must consider not only the number of deaths but the number of cases of non-fatal sickness, the duration of attack, and the seriousness of secondary effects or impairments. Unfortunately, our knowledge of these things is imperfect.

Another factor comes into the estimate of damage done—the relative value of the lives lost or temporarily disabled. The economic value of an infant is of course not as great as that of a wage-earner. On the other hand, we realize that economic value is an unsatisfactory measure of the value of life, and is one the public is inclined not to accept. Most of us would put the humanitarian side—the anguish caused those near and dear—above economic value; and on this basis the

loss of an infant may be as important as that of an older person. The argument that the loss of a wage-earner may have a serious effect on a greater number of persons is one deserving more consideration.

PREVENTABILITY AS A CRITERION.

Passing from damage done, we come to another criterion of the first importance—preventability. Certain of our “preventable” diseases are much more preventable than others. Small-pox is, by vaccination, almost absolutely preventable. Typhoid fever is another disease we are prepared to attack with great confidence if the necessary funds and powers are at our disposal. Infantile paralysis, on the other hand, is much more difficult to curb; and measles, with its period of infectivity principally before the appearance of symptoms, is largely independent of our efforts. Similarly, we expect quicker and more sharply defined results from infant hygiene work than from that directed against tuberculosis.

Attention must be given not only to the general preventability of the disease, but to the degree of prevalence. It is generally easier to secure results in a virgin field. After a death-rate has been forced down to a certain level, each new unit of reduction is successively more difficult. This is the problem of residuals, and must be considered with reference to local conditions.

COST OF PREVENTION AS A CRITERION.

A third major criterion is cost of prevention. The great importance of this factor is enforced by the meagre-

ness of the funds at our disposal. In some respects cost is the most important criterion of all. It can be argued that in considering activities we should determine what line of effort will save a unit of life or health for the least money, and then prosecute that activity alone until the law of diminishing return brings the activity to a par with its nearest rival.

Such a one-sided program is of course impracticable. Even if theoretically desirable, which is questionable, such a course would not be tolerated by public opinion. Great weight must, however, be given to the factor of cost. The figure used should include only that to the health department, and not that to society as a whole. Otherwise we shall become entangled in questions of other standards of value, such as comfort, convenience, and aesthetics; and these seem to be matters to be interpreted by the demographer, and evaluated by the people themselves.

COMMUNICABILITY AS A CRITERION.

Another factor that seems to deserve consideration is the communicability or contagiousness of a disease; in other words, its tendency to become epidemic. On account of this property, certain diseases, such as smallpox, must be suppressed immediately upon appearance, almost without regard to cost and, it may be, quite without regard to the amount of damage they may have done in the community during the last year, or the last ten years. Such diseases, if neglected, may quickly cause extremely abnormal damage. Communicability appears

not to be correlated with the other three factors. Infant mortality, for example, which receives high ratings with regard to damage done, preventability, and cost, receives a relatively low rating for communicability. Accordingly this factor seems to qualify as a separate criterion.

SOLUTION FOR RELATIVE VALUES.

In general, then, the relative value of a disease, or of an activity to prevent a disease or diseases, would seem to depend on four prime factors: first, amount of damage done; second, preventability; third, cost of prevention; fourth, tendency to become epidemic. As a formula this might be expressed:

$$\text{Value} = \text{Damage} \times \text{Preventability} \times \text{Cost} \times \text{Communicability}.$$

Certainly these seem to be the main criteria. Perhaps weights should be assigned to the four factors, but this is a refinement one hesitates to attempt. It should be noted that in the formula, cost is in the nature of an inverse factor.

One other point deserves attention. Certain activities are indispensable to a health department. For example, nothing is more important than the registration of vital statistics, yet it is obviously difficult to assign any number of deaths prevented by this work. Similarly it is difficult to measure the results of health education, although we feel sure it is an important part of the program. Perhaps activities of this kind should be regarded as in the nature of "overhead" charges. At all events, they should be assigned a liberal value.

RELATIVE VALUE OF DIFFERENT
CAUSES OF DEATH.

The task of applying these criteria and of deriving a set of values is a difficult one. In offering the following values no claim is made for a high degree of accuracy. It is believed, however, that the values derived permit a considerable margin for difference of opinion without altering the general conclusions which the figures suggest. The method may, moreover, suggest ways in which more accurate values eventually will be derived. The calculations involved appear in Tables 2 and 3.

Starting with the original list of preventable deaths (Table 1), an estimate has been made of the damage done by the different causes. This estimate is intended to give due weight to non-fatal illness, and the other

damage factors already mentioned. The proportions of damage done assigned to the diseases are, arranged in order of magnitude, as follows: tuberculosis, 25 per cent.; infants' diseases, 25 per cent.; venereal diseases, 20 per cent.; the four common contagious diseases of children, 15 per cent.; typhoid fever, 5 per cent.; other infectious diseases, 8 per cent.; nutritional diseases, 1 per cent.; and poisoning by food, 1 per cent.

These values have been multiplied by what seem appropriate factors representing preventability, cost of prevention, and tendency to become epidemic, the various steps of the computation appearing in Table 2. The resulting values, which relate to causes of death and not to lines of activity are, when reduced to per cents and arranged in order of magnitude, as follows.

TABLE 2.

CALCULATION OF VALUES FOR DIFFERENT CAUSES OF PREVENTABLE DEATH—AND ADJUSTMENT TO INCLUDE VALUES ARBITRARILY ASSIGNED.^a

Cause of death.	I. Per cent. of deaths.	II. Estimate of damage done.	III. Factor ^b for preventability.	IV. II times III.	V. Factor for cost. ^c	VI. IV times V.	VII. Per cent.	VIII. Factor for communi- cability.	IX. VI times VIII.	X. Per cent.	XI. X times 0.73.
Tuberculosis.....	37.5	25.0	6	150	4	600	14.5	5	3,000	16.9	12.3
Infants' diseases.....	34.0	25.0	8	200	10	2,000	48.4	3	6,000	33.9	24.7
Diarrhea and enteritis.....	(20.0)										
Bronchopneumonia.....	(14.0)										
Contagious diseases of children.....	12.6	15.0	6	90	6	540	13.1	10	5,400	30.5	22.3
Venereal diseases.....	3.3	20.0	5	100	4	400	9.7	4	1,600	9.0	6.6
Typhoid fever.....	3.7	5.0	9	45	8	360	8.7	3	1,080	6.1	4.5
Other infectious diseases.....	7.9	8.0	5	40	5	200	4.9	3	600	3.4	2.5
Nutritional diseases.....	0.7	1.0	6	6	5	30	0.7		30	0.2	0.1
Poisoning by food.....	0.2	1.0	1	1	1	1	0.0		1	0.0	0.0
Industrial poisonings.....	0.1										
Total.....	100.0	100.0				4,131	100.0		17,711	100.0	73.0

^a Based on mortality in all registration cities, 1913.

^b Factors on a scale of 10; that number being most favorable rating, one being the least favorable.

^c Cost—to health department.

^d Disregarded.

Values arbitrarily assigned:

Inspection of school children.....	7.0
Education.....	5.0
Vital statistics.....	5.0
Dispensary and clinics.....	5.0
Laboratory.....	5.0

Total..... 100.0

First: infants' diseases, 33.9 per cent. The two causes included under this heading, diarrhea and enteritis under two and bronchopneumonia, are responsible for 34 per cent. of the deaths in the preventable list. Bronchopneumonia, responsible for 14 per cent., includes deaths of other than infants; but the median age of the deceased is 1.5 years, and 68 per cent. of the deaths occur among children under five. To compensate for the deaths improperly included, there are the deaths of infants from several other causes which I have disregarded, —such causes as pneumonia, and the group Diseases of Early Infancy. Deaths of infants under two amount to over one fifth of all the deaths that occur, and in our list of preventable deaths this group of infants accounts for over a third of the total. In an unworked field, infant mortality offers a high degree of preventability at a low cost; if it were not for a low rating on communicability it would attain even a higher value than it does.

Second: the four contagious diseases of children, 30.5 per cent. These diseases are responsible for 13 per cent. of the preventable deaths, and are estimated to be responsible for 15 per cent. of the damage done. They are the most likely to become epidemic, a fact that contributes largely to their high final rating.

Third: tuberculosis, 16.9 per cent. Although responsible for 37.5 per cent. of the preventable deaths, its value is reduced by high cost of prevention, moderate preventability, and absence of the acute tendency to become

epidemic that characterizes some of the other communicable diseases.

The fourth value falls to the venereal diseases, 9 per cent. Although only 3.3 per cent. of the preventable deaths can be definitely ascribed to these diseases it is certain that they cause many deaths that are registered under other titles. In addition, there is a tremendous number of non-fatal cases, and the indirect results of these are frequently grave. Conservative estimates have placed the number of cases in the country at two or three million. This field is almost untouched, and health department effort in the way of education, diagnosis, and treatment, should accomplish great good.

The fifth place goes to typhoid fever, with a value of 6.1 per cent. Then follow other infectious diseases, 3.4 per cent.; and nutritional diseases, 0.2 per cent. Poisoning by food registers less than 0.1 per cent.

These are values calculated for the different causes in our list of preventable deaths. It is necessary now to make allowance for certain diseases, such as cancer and the degenerative diseases of middle age, which were not included in that list; to make allowance for certain activities that are indispensable to a health department; and to express the result in terms of health department organization.

VALUES ACCORDING TO LINES OF ACTIVITY.

To health education an arbitrary value of 5 per cent. in the final scale is assigned. This item will cover activities in behalf of the semi-preventable diseases just mentioned. Similarly, a

value of 7 is assigned to the physical examination of school children, and a value of 5 to each of the following activities: vital statistics, dispensary

and clinics, and laboratory. As these arbitrarily assigned items aggregate 27 per cent., it is necessary to reduce proportionally the previously determined disease values to make them total 73 per cent. Table 3 exhibits the distribution of what seem appropriate parts of these reduced values among the following activities: milk control, privy and well sanitation, fly and mosquito suppression, tuberculosis, infant hygiene, control communicable diseases.

TABLE 3.
DISTRIBUTION OF DISEASE VALUES ACCORDING TO LINES OF HEALTH DEPARTMENT ACTIVITY.

Disease.	Relative value.	Milk control		Food sanitation.		Privy and well sanitation.		Fly and mosquito suppression.		Tuberculosis.		Infant hygiene.		Control communicable diseases.	
		Fraction. ^a	Value.	Fraction.	Value.	Fraction.	Value.	Fraction.	Value.	Fraction.	Value.	Fraction.	Value.	Fraction.	Value.
Tuberculosis	12.3	02	25			06	1.49	06	1.49	98	12.05	82	20.34	98	21.85
Infants' diseases	24.8	06	1.49	b.	b.	(10)	(10)	(10)	(10)			(70)		39	1.76
Diarrhea and enteritis		(10)	b.	b.	b.							(10)		66	1.65
Bronchopneumonia	22.3	02	4.5	b.	05										
Contagious diseases of children	6.6	b.	b.	b.	01	40	1.80	10	4.5						
Veneral diseases	4.5	10	4.5	01	05	10	25	20	50						
Typhoid fever	2.5	02	05	02	05										
Other infectious diseases	0.0			1.00	00										
Poisoning by food															
Total	73.0		2.69		10		3.54		2.44		12.05		20.34		25.26

^a "Fraction" indicates fractional part of disease value estimated preventable by activity.
b. Not distributed.

TABLE 4.

Final values* as applied to activities directly concerned with:

Control of Communicable Diseases—

Tuberculosis	12.1
Veneral diseases	6.6
All others	25.3
Infant hygiene	20.3
Privy and well sanitation	3.5
Milk control	2.7
Fly and mosquito suppression	2.4
Food sanitation	0.1
Inspection of school children	7.0
Vital statistics	5.0
Education	5.0
Dispensary and clinics	5.0
Laboratory	5.0

Total..... 100.0

* For a more detailed subdivision of values see, Chapin, C. V.: "Effective Lines of Health Work," *The Providence Medical Journal*, January, 1916. Persons interested in relative values should consult also, "How Shall We Spend the Health Appropriation," by the same author, *AMERICAN JOURNAL OF PUBLIC HEALTH*, Vol. III, No. 3, page 202.

The value 25.3 for communicable diseases other than tuberculosis and the venereal diseases may seem high as compared with the values for those specific diseases and that for infant hygiene. On the other hand, this 25.3 per cent. must cover the work against the common contagions of

children, as well as that against typhoid fever, smallpox, and others of the more unusual diseases. It must take care also of the possibilities in connection with pneumonia. In addition, infant hygiene is represented by 4.5 per cent. in the allowances for milk control, privy and well sanitation, and fly suppression. It is assumed that control of communicable diseases will be carried on with modern epidemiological methods, public health nurses, and emphasis on bedside disinfection of discharges.

The list of final values does not consider industrial hygiene; not because the work is unimportant, but on the theory that state authorities will meet the need. Plumbing inspection does not appear, partly because of lack of evidence to justify its insertion, and partly because this is considered work for the building department. Nuisance abatement is intentionally omitted; it is realized, however, that health departments commonly must carry this largely police function. The privy, well, fly, and mosquito work, for which allowance has been made, cover the important sanitary parts of what is generally understood by nuisance abatement.*

Before leaving these values it seems wise to utter a few words of warning. The values are based on the rates of mortality existing in registration cities

as a whole in 1913, and thus represent certain average conditions. Local conditions will of course modify any values, as will the passage of time and the development of sanitary science. Similarly, the importance of different health measures in any one city will be different at different times. It must be confessed that the existing data for the determination of relative values is seriously inadequate. What we need for better values is better vital statistics and better cost-keeping. Probably nothing would be a greater help to the progress of this subject, and perhaps of sanitary science in general, than for our health officers to form the habit of keeping careful records regarding new procedures, together with statements of the results and the costs. These could be published in the departments' annual reports; and thus there would be accumulated a mass of data comparable to that in the handbooks now existing in the fields of civil and mechanical engineering.

Some health officers, of course, do this already; none more admirably than Doctor Chapin of Providence. On this occasion one is tempted to express one's admiration of Doctor Chapin's reports and other writings, and say what models of scientific work they are, and say how much we all owe to him. But one hesitates to do so, from fear that he would dislike it. At all events, when we have more reports like Doctor Chapin's we shall be in a fair way to get our judgments of relative values onto a definite quantitative basis.

Making liberal allowance for inaccuracies in the values here presented,

* For a vigorous exposition of existing inconsistencies see, Armstrong, D. B., "Public Health Values—A Few Modern Fallacies," Proceedings of the Fifth Annual Conference of Mayors of New York State, 25 Washington Ave., Albany, 1914. For an excellent critical discussion of the relative value of different branches of his own work by a practising health officer see, Terry C. E., Annual Report of the Board of Health for 1915, Jacksonville, Fla., page 47.

and for possible differences that may be occasioned by local conditions, the following conclusions seem fully justified: The prevention of infant mortality is a fundamental activity, and one of the most valuable a health department can pursue. Very exceptional is the city in which this work can be ignored without convicting the health authorities of gross neglect. Anti-

tuberculosis work and that involved in the control of the common contagious diseases, are other activities of prime importance. In addition, it seems time to admit the venereal diseases to the group of larger opportunities. In most cities the value of the above mentioned lines of activity is considerably greater than that of the various forms of sanitary inspection.



TUBERCULOSIS NURSING—PRESENT AND FUTURE.

"Ten years ago tuberculosis nursing, like every other phase of the tuberculosis movement, was still in the pioneer stage. In the entire country there were approximately four hundred nurses doing tuberculosis visiting work, three hundred and sixty-five of whom were engaged primarily in general visiting nursing, the tuberculosis cases they were handling occupying only a fraction of their time and attention. Some twenty-five or thirty nurses were devoting their entire time to tuberculosis work. Today there are eight hundred and twenty-five nurses doing tuberculosis nursing exclusively, two thousand one hundred and fifteen doing general visiting and tuberculosis nursing, a total of nearly three thousand nurses engaged in caring for tuberculosis cases in their homes," states Miss F. Elisabeth Crowell, Executive Secretary of the New York Association of Tuberculosis Clinics in the August *Journal of Outdoor Life* in an article entitled "Ten Years in Tuberculosis Nursing—A Review and a Forecast."

Since no figures are available for the work done in the country at large, Miss Crowell quotes some New York figures which she believes typical of the expansion throughout the United States. "In 1904-1905 eighteen nurses made 12,504 visits to tuberculosis cases alone. In 1913 one hundred and eighty-seven made 253,842 visits to tuberculosis cases alone. During the last ten years the death-rate from tuberculosis has decreased from 2.18 to 1.60 per 1,000 population."

While the author does not attribute this fall in the tuberculosis death-rate to the activities of such nursing alone, of necessity recognizing other contributory factors, she believes that "not a single one of these factors reached its culminating point of usefulness until the tuberculosis nurse was called to concentrate her efforts upon its practical application to the lives of those who were infected with tuberculosis or were exposed to infection."

In forecasting the future during the next ten years, Miss Crowell laments the fact that now that the tuberculosis machinery has been organized more adequately than ever before, the tendency seems to be to use this machinery for other kinds of work, rather than providing an additional force for the other types of visiting nursing.

"Tuberculosis is still a problem. Child-welfare work is not yet reduced to a rule of thumb. Mental hygiene work is still in its infancy. We have not wiped these problems off the slate after the concentrated effort of several years. Will spreading ourselves out thin over a variety of problems bring us any nearer to their final solution? There is such a thing as over-organization and in its way it is as bad as over-specialization. Administrative procedure has been known to choke itself with red tape. There is no such thing as one-hundred-per-cent. efficiency as long as the personal equation must be considered."

THE HARM DONE IN ASCRIBING ALL BABIES' SORE EYES TO GONORRHŒA.

CAROLYN CONANT VAN BLARCOM,

Secretary, National Committee for the Prevention of Blindness, Chairman, Committee on Prevention of Blindness and Midwives, National Organization for Public Health Nursing. President, New York State Organization for Public Health Nursing.

Read before the Sociological Section, American Public Health Association, Rochester, N. Y., September 9, 1915.

IN WORK for the prevention of blindness, as in other public health movements, it has been necessary to use certain medical facts as the foundation for widespread public education.

In popularizing medical facts, certain misconceptions will almost inevitably gain currency, some of which are harmless, while others actually defeat the very ends which it is desirable should be attained. One of the most serious of these misconceptions concerning the prevention of blindness in babies is the one that this disease is always, or nearly always, of gonorrhœal origin. In fact, this seems to be the general teaching even in medical circles.

Dr. Ellice M. Alger sums it up as follows: "Both the physician and layman of today consider ophthalmia neonatorum as essentially of venereal origin. All the text-books teach that, for all practical purposes, it is due to an infection of the conjunctiva with the gonococcus. Every case of conjunctival discharge beginning during the puerperal period is at once regarded by physician and mother and

friends as a certain proof of an antecedent infection of the mother, received of course through a delinquent husband. All the popular pseudo-scientific teaching, of which we have so much today, lays special stress on this point. Now this is distinctly only about half true and like many other half truths, it has done a tremendous amount of harm. The gonococcus is one of a number of germs which may cause ophthalmia."*

Further on, Doctor Alger says: "The bacteriological diagnosis is of secondary importance, for the treatment is the same no matter what the germ."

We believe that blindness from babies' sore eyes would practically never occur if a prophylactic were used in the eyes of every infant immediately after birth, and if every case of redness, swelling and discharge from the eyes of infants were promptly and adequately treated.

We say to the lay public—babies' sore eyes is an infectious disease; is caused by a germ; if neglected, it may

* *New York State Journal of Medicine*, December, 1911.

result in blindness; the way to prevent this blindness is to adopt a routine use of a prophylactic and secure early treatment for all cases of babies' sore eyes. The public has learned a good deal about disease and infection and the belief has taken deep root that this inflammation of the eyes of infants that we all talk so much about is due to gonorrhœa and gonorrhœa only.

We are convinced that the gonorrhœa theory has been a serious obstacle in the way of universal prophylaxis and early remedial treatment—in some instances because of pride, and in not a few others because of the conviction that there was no venereal infection present.

This theory has been given wide currency, but is it warranted? A study of some of the medical writings would suggest that it is not.

Although organized work for the prevention of blindness is recent, the pathos and horror of infantile blindness has stirred medical men to action almost since the dawn of medicine. Very early there seemed to be a realization that there was something in babies' eyes capable of setting up inflammation and causing blindness and which could or should be removed or destroyed. This may explain why the ancients dropped oil in the eyes of newborn infants.

More than a hundred years ago—in 1807—Benjamin Gibson, an Englishman, made very sound recommendations for the prevention of blindness advising that every child's eyes be washed immediately after birth with

“a liquid calculated to remove the offending matter, or to prevent its noxious action.”

There are many references of a similar nature to be found in medical literature, but in 1881, Professor Credé, the Leipsic obstetrician, made the most valuable contribution to this subject which had thus far been offered. Briefly, as the members of this audience all know, he advised that every child's eyes should be carefully wiped from the nose outward immediately after birth, and that a drop of a 2 per cent. solution of silver nitrate should be dropped into each eye. As a result of this treatment, Professor Credé reduced the occurrence of babies' sore eyes among the patients in his maternity hospital from about one in every ten cases to one in every four hundred. In addition to this preventive treatment, the infant's eyes were watched for evidence of inflammation—*i. e.* redness, swelling or discharge.

Sydney Stephenson, in his masterly monograph on “*Ophthalmia Neonatorum*”^{*} has placed in available form more information concerning this disease, its cause and prevention than has been collected thus far by any other person or persons, so far as we are able to learn. His book opens with the observation that: “*Ophthalmia neonatorum* may be defined as an inflammatory disease of the conjunctiva usually appearing within the first few days of life, and generally due to the action of micro-

^{*} The Middlemore prize essay of the British Medical Association of 1907.

organisms." Later on he says: "Let us first inquire in what proportion of cases of ophthalmia neonatorum the gonococcus has been demonstrated." Then follows a table. Continuing, "The above table shows that in the practice of 41 observers gonococci were found in 67.14 per cent. of the 1,658 cases of ophthalmia neonatorum."

Finally he observes: "It may be stated in round numbers that of every 100 cases of ophthalmia neonatorum, 65 per cent. will be associated with gonococci, 10 per cent. with pneumococci, 5 per cent. with bacillus coli, 5 per cent. with other pathogenic organisms, as the Koch-Weeks bacillus, and 15 per cent. will show negative bacteriological findings."

More recent figures, collected by American observers, suggest that the gonococcus is present in a still smaller percentage of cases than the one given by Stephenson. Of 167 cases of "suppurative conjunctivitis" reported to the New York City Department during 1914, the gonococcus was demonstrated in but 34, while in 1,376 cases of babies' sore eyes reported to the Boston Department of Health during 1914, but 37 were of gonorrhœal origin.

The late Dr. Mark D. Stephenson of Ohio, writing in this connection, says: "Therefore, it is advisable in the present stage of our work for the prevention of blindness from babies' sore eyes, that the old idea among the public that it is always or nearly always gonorrhœal in its origin, should be corrected. The laity should

be taught the plain facts, that while a certain small percentage of cases of babies' sore eyes are caused by the gonococcus, the larger majority of the cases are produced by the various ordinary forms of pus-producing germs that are likely to be found in any mother; and that the presence of babies' sore eyes does not necessarily imply any guilt or wrong on the part of either parent. So long as the disease is thought to be purely gonorrhœal in its origin, there will be associated with its treatment and attempts at its prevention a great deal of unnecessary embarrassment to the family and the physician. If such a belief is prevalent the physician will naturally be afraid, in many families, to suggest the use of prophylactic, fearing that it will be considered a reflection on the character of the mother or father. Parents would also be afraid to suggest, let alone insist on, the use of a prophylactic. As a not necessarily gonorrhœal disease, its public discussion will be much easier; it will receive more respectful attention, and will not be considered a part of the present almost hysterical propaganda with regard to sex hygiene and other subjects that are sometimes too freely discussed."*

In the free public discussion such as Doctor Stephenson suggests lies our hope for a successful campaign against preventable blindness.

Year by year this subject comes up at medical meetings and conferences

* *Journal American Medical Association*, Sept. 12, 1914.

of health officers, nurses and social workers. The statement is made and reiterated that nearly a quarter of the blind children in the schools for the blind in this country are sightless because of a negligent accoucheur. The statement that ophthalmia neonatorum is both preventable and curable has become axiomatic. Almost each year there is written on the statute books of some state a law which is designed to safeguard the eyes of babies. And yet the percentage of ophthalmia neonatorum victims admitted to the schools for the blind year after year varies but slightly, and we are forced to admit with no little chagrin that scarcely more than a scratch has been made on the surface of the problem as a whole.

If the sad procession of little blind children, with state institutions as their goal, is to be eliminated, something more definite and practical will have to be done than the enactment of laws which only become dead letters, and the making of speeches and reading of papers before selected audiences.

Unquestionably, the first step is the enactment of laws providing for the compulsory reporting to local health officers of all cases of babies' sore eyes. This would make possible the provision of medical attention for all uncared-for cases.

But we find upon making a survey of the laws, that more than half of the states (30) require that ophthalmia neonatorum be reported. Why, then, are the babies still going blind? It is because, excepting in very few communities, the law is neither obeyed

nor enforced, nor is any action taken when information upon an occasional case of babies' sore eyes does find its way to the local health department. The facilities at the disposal of the average health officer for giving efficient assistance to the physician or the midwife are so limited as to be practically without value.

A nurse should be employed by each local health department to visit each midwife case and to secure such care as is necessary, and also to give visiting nurse assistance to those doctors who wish it; and in addition to this, there should be eye clinics to supplement home care and also such hospital facilities for the reception and care of severe cases of ophthalmia neonatorum that, without an hour's delay, an infected baby and its mother may be admitted and the work of saving its sight begun at once. The importance of admitting the mother with the baby merits attention for the moment. Maternal nursing is advocated for all babies unless for some special reasons it is contraindicated. This is particularly desirable for a sick baby. The baby with sore eyes is a sick baby, and is struggling not only to live but also to combat a severe local infection. Many ophthalmologists express the opinion that the prospect of saving the sight of a bottle-fed baby with sore eyes is at best discouraging.

The value of some such practical work as outlined above has been demonstrated in a few—but very few—of our American cities. In Buffalo, for example, the health commissioner re-

cently notified each physician in his city that babies' sore eyes was a reportable disease and that all physicians and midwives found to be disregarding this legal requirement would be prosecuted, and, in order to assist the doctors, he offered nursing service and bacteriological examinations or would provide hospital care for infants needing more than home care. All midwife cases are visited and supervised by the Department of Health.

It cannot be denied that such work as has been started in Buffalo would be possible for many local health officers, because of the absence of legal authority to act; the lack of facilities with which to carry out the provisions of the law, should one exist; or, what is most important of all, the lack of support of this branch of public health work by the people in the community.

No amount of effort on the part of the health officer can be effective if, after bringing a case into court, the judge dares to throw it out with the remark that "any baby may have sore eyes, just as any one many fall down stairs," as actually happened in Connecticut.

Quite obviously, the crux of the situation is to be found in the educational work, for no amount of legislation will protect the eyes of the individual baby if public opinion is not back of the enforcement.

The public must be so informed and enlightened that the health officer will feel secure in attempting to exercise his prerogatives, and the courts will not dare to disregard the rights of even an infant citizen to the state's protection.

In short, the success of our endeavor to secure the routine use of a prophylactic, the unfailing observation of the reporting law, the employment of a visiting nurse for eye work, and the provision of hospital facilities is really in the hands of the public and rests upon a foundation of publicity.

And just here at this most important point in the whole endeavor is where the harm is done in ascribing all babies' sore eyes to the gonococcus. If we are to have the coöperation of the public at large, which is absolutely necessary to a successful prosecution of this effort, the mind of the same public must be disabused of the idea that infant ophthalmia is a disgrace. Blindness following a streptococcal infection is as endless and dark and tragic as that caused by gonorrhœa and the methods of prevention are the same.

The control and reduction of venereal disease will unquestionably do a great deal toward the prevention of more than one kind of blindness, but it is only fair that the question of babies' sore eyes should be handled impartially; that we make it understood that the disease does not necessarily carry with it a stigma but that any child in any walk of life may have sore eyes and go blind as a result. From the practical point of view of prevention, it does not matter what the organism is that causes the disease. What does matter is that every child's sight shall be safeguarded.

To sum up, if babies are to be saved from blindness the country over, the use of prophylaxis at birth must be routine, and early treatment must be

invariable. The successive steps to be taken are (1) the enactment of laws by state legislatures; (2) fearless and remitting action on the part of local health officers in enforcing these laws;

and (3) staunch support and coöperation from the public at large.

This requires public education—widespread and unceasing—sane and unprejudiced.



THE UNUSUAL.

"There has been much ado, there has been much running to and fro, much offering of prizes for miraculous cures developed on short notice, and much newspaper and other talk over the alleged presence of an epidemic of anterior poliomyelitis. It is quite right that there should be active agitation over this disease, but the only reason that there is this unusual stir, is that infantile paralysis is uncommon, and that its epidemics are, for this country, comparatively new. We have had diphtheria and measles and scarlet fever with us for a long time, and yet, we believe, no large prizes have been offered for their cure, no specialists have been hurried to the scene of the epidemic to see what could be done to check its spread, and the national government has never had a hand in its suppression. Even local authorities have seldom taken the trouble to clean up on a large scale in order to check an epidemic of these diseases. Yet the death toll from diphtheria is still approximately 25,000 for the United States each year, the mortality from scarlet fever is six times that from anterior poliomyelitis, while its annual incidence in all our cities usually far surpasses that of the worst outbreaks of the more unusual malady. Even tuberculosis, about which there was a wave of excitement some time ago, is fairly holding its own with a death-rate reduced only from 201 to 147. Infantile paralysis is always present in the community, but it leaves a large percentage of cripples in its wake, and so seems the more dreadful. Doubtless this has something to do with our fear of it, but the

crippling from scarlet fever alone, the impaired hearing, damaged kidneys, and heart defects, if not so evident, is more serious than an abbreviated and weakened limb, and the army of scarlet fever cripples is larger than we realize. The same is true of measles, diphtheria, whooping-cough, typhoid, and malaria.

"We become attached to old acquaintances, especially those that were once believed to have been sent for our chastisement and the correction of our evil ways, and perhaps, after all, we like to have the plagues (no one calls *them* such) of the good old infections with us. At any rate, no one is making any great fuss about them commensurate with that which is being made over this less common and less destructive disease.

"Our dollars and cents seem very precious and we use them for other purposes than health protection. We cannot, or at any rate do not, afford even a national department of health, though we do have a department much devoted to the health of plants and animals. We often have no local health departments, and where we have them they are usually badly hampered for lack of both funds and moral support. If popular agitation over the presence of anterior poliomyelitis could only help to open the eyes of the public to the more disastrous but more familiar sources of untimely injury and death—to our other annual disease plagues—we might even be thankful for its prevalence during the past two months."—*New York Medical Journal*, August 19.

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A REVIVAL OF SHOT-GUN METHODS IN EPIDEMIC CONTROL.

The present is an opportune time to again call attention to the important part which the transfer of the fresh secretions of the nose and mouth plays in the transmission of so many common infections. Health officers must repeatedly impress upon the public the paramount necessity of avoiding contact infection. People should be made to appreciate that they have in their own hands the most powerful weapon to ward off disease. It is not dependent on the efficiency of health officers, or municipal appropriations. Every one can keep the fingers out of the nose and mouth and teach his children to do the same.

The eastern United States have, this year, been visited by two infectious diseases over which official action has as yet obtained little control. In the winter we had influenza. For various reasons the ordinary methods of notification and isolation have no appreciable effect on its prevalence. Yet no one doubts that the individual can do much to protect himself. The avoidance of contact infection and the avoidance of close proximity to persons who are coughing and sneezing are real preventive measures which each one can apply for himself. This was forcibly referred to by Professor Rosenau in remarks printed in the April number of this JOURNAL.

Now poliomyelitis is rapidly becoming widespread. Health departments are unable to formulate methods of control for which they can promise success. While we can say definitely that if certain things are done typhoid fever will surely be reduced; while we can promise the eradication of malaria and yellow fever and can stamp out plague and can give assurance that complete vaccination will banish smallpox, many health officers have adopted a shot-gun policy of recommending for poliomyelitis every known epidemiological remedy in the hope

that one may hit the mark. Individual housecleaning and municipal housecleaning, the avoidance of domestic animals, the extermination of vermin, screening against flies, attention to the food supply as well as personal cleanliness and the avoidance of contact are advised. Is there not danger that in this multiplicity of directions little that is really effective will be done? The public will select the remedy which suits their fancy.

It is a reminder of the persistence of error that there is noticeable today quite a tendency to return to the teachings of the pseudo-sanitarian of fifty years ago and to attempt to stamp out disease by a general clean up. Even in former days, when almost nothing was known of the nature of infection, and very little about its transmission, there was no reason for the old filth theory of disease and for the restriction of the art of sanitation to housecleaning. It has been hoped that this leaf in the history of sanitation had been turned over never to be turned back. It was hoped that the efforts of health officers would hereafter be based on knowledge and not on guesswork. Even in the case of those diseases like typhoid fever and cholera, which in a sense are transmitted by filth, though not bred in filth, a general campaign of cleanliness usually missed the mark. Essentials were omitted and emphasis placed on the wrong thing. Success is attained only when the real danger is known and removed. Clean streets and model garbage rules will never cut down typhoid fever but the removal of privies will. A shot-gun policy in public health work is as absurd and useless as an old time shot-gun prescription in therapeutics.

Unfortunately many influential daily papers have eagerly adopted the suggestion that dirt may be the cause of poliomyelitis and have boldly proclaimed that the latter is a "filth disease" pure and simple and see the only remedy in clean streets and yards. Clean-up campaigns have been inaugurated which are absolutely useless and entirely unwarranted by any knowledge at our command. The filth theory of disease, which it was hoped was dead, shows signs of activity and amateur sanitarians are trying to fan it into life again.

It is true that all too little is known about poliomyelitis, but the facts best established, and well established, are, that the infectious agent is found in the secretions of the mouth and nose, not only of the acutely sick, but of convalescents and healthy contacts. It is also proved that the transfer of these secretions to the healthy mucous membrane of experimental animals gives rise to the disease. Is not the evidence good that the disease is spread by contact much as diphtheria is spread? Are not other modes of transference quite hypothetical? Is it not likely to prove more effective to confine our efforts to what we know? We should in no uncertain manner make it clear that the essential feature of the official control of this disease is the isolation of infected persons. It is also safe to teach that every one, to a large extent, is responsible for his own protection. If the fingers never go to the nose, or mouth, and if nothing goes to the mouth except clean eating utensils and clean food the danger of contracting poliomyelitis and the whole numerous group of saliva-borne diseases will be reduced to a minimum.



THE PERIOD OF LIFE AT WHICH INFECTION FROM TUBERCULOSIS OCCURS MOST FREQUENTLY.

HOW MAY WE DIMINISH THE FREQUENCY OF THOSE INFECTIONS AND PREVENT THEM FROM BECOMING TUBERCULOUS DISEASE?*

WITH APPENDED NOTES ON A SUCCESSFUL ANTITUBERCULOSIS COMMUNITY EXPERIMENT IN AUSTRALIA AND A PROJECTED ONE IN AMERICA.

S. ADOLPHUS KNOFF, M. D.,

Professor of Medicine, Department of Phthisiotherapy at the New York Post-Graduate Medical School and Hospital; Visiting Physician to the N. Y. Health Department's Hospital-Sanatorium for the Consumptive Poor.

Read before the Public Health Administration Section, American Public Health Association, Rochester, N. Y., September 8, 1915.

This paper not only contains Doctor Knopf's own valuable conclusions upon the subject presented, but it is also a compendium of the opinions which Doctor Knopf has secured from a number of other eminent physicians.

FOR a soldier, whether in time of peace or war, whether fighting in defense of his country and obliged to kill or fighting an insidious enemy like tuberculosis and thus seeking to save life, the first duty is to obey. Even if in his own judgment the task assigned to him seems impossible, if his superior officer commands it he must do the best he can.

These were about the thoughts that came to my mind when my superior officer, Dr. W. S. Rankin, the Chairman of the Program Committee, assigned to me the above topic to present before the Public Health Officials' Section at this meeting. I asked myself, who

knows anything about the period of life at which infection from tuberculosis occurs most frequently? I was sure I did not. My own statistics tell only of the occasionally recalled exposure to infection during adult life and of the cases of tuberculosis of either parent where there was a likelihood that infection had taken place some time during infancy or childhood, or even later, but at what exact age I had no way of knowing. In fact, I always thought that while it is possible to get statistical data of the period at which the tuberculous disease manifests itself, it is utterly impossible to determine the exact period of infection. But I was not going to be discouraged because of my own ignorance, and the fact that I did not know the period of life at which infection from tuberculosis

* A revised and enlarged article which was originally the subject of an address delivered by invitation before the American Public Health Association at its 43d Annual Meeting in Rochester, N. Y., September 8, 1915.

occurs most frequently did not at all mean that others might not know a good deal about it. So in order to carry out the program, I determined to find out what information I could get on this subject.

I wrote forty letters to well-known specialists on tuberculosis and to internists who see a good deal of tuberculosis in their consultation practice, and twenty letters to well-known authorities on diseases of children.

I asked for the percentage of children infected with tuberculosis in general, at what age in particular, and what organs were most frequently involved. I then asked for the method of invasion and how often the infection could have been considered pre-natal. I then tried to ascertain at what period of life an infection, contracted in infancy or childhood, had the greatest likelihood to become active, and at what period of life in general tuberculosis had been found most frequently in the adolescents and the adults. Lastly, I asked my correspondents, in case no statistics were available, to favor me with their general impressions on the subject.

Many of my correspondents did not fail to impress upon me the difficulty of the task I had undertaken; some wrote encouragingly and some discouragingly, but all agreed on the great vital importance of such a study. Following are quotations from a few of the letters I received:

From our beloved Dr. E. L. Trudeau, the great scientist and scholar, friend and beloved physician, whose recent passing away deprived us of the greatest American authority on tuberculo-

sis, but who, let us hope, has left with us his spirit, his enthusiasm, his devotion to the cause and inspiration to go on and on with the work, I received the following kindly note: "You must excuse me from answering the questions you are asking the rest of the profession. To be accurate it would involve an amount of work which I really don't think I can give to it. I hope the result of your inquiries will throw some light on this very obscure question."

Dr. Lawrason Brown, of Saranac Lake, said: "Really an inquiry such as your question would indicate would settle the whole matter and it seems to me almost impossible to determine the answer to question 6 (concerning mode of invasion). This would be largely guesswork, but if it could be based on scientific research would settle many vexed questions. I might say that I feel that the whole subject of etiology should be gone over again and some of us here are planning to do a little work in the matter."

Prof. S. Solis Cohen, of Philadelphia, said: "I shall be much interested in the result of your studies, and especially in your conclusions from your own statistics, which to me would be of vastly more importance than the guesses of all the rest of us put together." (I wish the good doctor would be half right in this assertion.)

Prof. Theodore C. Janeway, of Johns Hopkins, wrote me from his summer home: "The problem you have taken up seems to me one of the most fundamental for our understanding of the mode of infection in tuberculosis and for the selection of effective measures

of prevention. Exact statistics from a large number of sources on each of the points you raise will be of great help towards its solution. I wish I might contribute some, but I am entirely out of reach of my data, which are in Baltimore. I am most anxious for light on this problem and shall await the results of your study with great interest."

Prof. William P. Lucas, of San Francisco, makes the following significant statement: "I should be very glad to see your report lead to some immediate and definite attempt to really take up the subject from a statistical and scientific standpoint on a large scale throughout this country including all the children's hospitals in at least the university centers."

Dr. David R. Lyman, of the Gaylord Farm Sanatorium, wrote me: "I greatly regret that it is impossible for me to find time to go through my records for the data for which you ask. I recognize the great importance of the question and the need for its presentation and discussion."

Prof. John L. Morse, of Boston, writes: "It seems to me that in general a great many statements are made regarding tuberculosis in infancy and childhood on an insufficient basis. It seems to me, moreover, that a great deal of the discussion which is now going on about tuberculosis in childhood is in relation to entirely unimportant points and that there is danger of overlooking or neglecting the few important points."

Dr. Joseph E. Winters, Professor of Clinical Medicine, New York, writes: "My experience at Cornell and else-

where convinces me that the diagnosis of tuberculosis in children is at present too hastily made and on insufficient evidence. Tuberculosis in childhood is not a latent disease as in adults. With the exception of glandular tuberculosis, it is an active and rapidly progressive disease. Its symptoms and signs are distinct, clear, and unmistakable. Would that I had the time to devote to the subject which it merits."

My good friend, Dr. Charles L. Minor, of Asheville, N. C., does not think a lifetime enough to go over his statistics, and this is what he says concerning them: "I have a vast amount of carefully kept histories, but I have no time to get up statistics out of them, and I expect I will be dead before that opportunity offers. In fact, I think we could have a very nice time in heaven going over and catching up with the work we had begun on earth." May Doctor Minor be spared a long time to continue his work on this earthly sphere, but when the time does come for him to pass to his heavenly abode and reward, I hope he may find more pleasant work to do in the other world, unless of course he should find working on tuberculosis statistics the most congenial heavenly occupation.

I must quote from another letter received a few months ago, not amusing and cheerful like the foregoing but, on the contrary, deeply sad and depressing, coming from the war zone where they are trying to do the very reverse of that for which we are assembled here. While we are bending all our energies to save life, prevent

untimely death and to further human happiness and peace, in Europe at this very moment they are sacrificing the best and most virile youths of the nations, killing and maiming thousands and sowing the seed of hatred and enmity among the nations. This must have been the thought of the Regius Professor of Oxford, Sir William Osler, when he wrote to me. This great man, though far removed from us, still takes the keenest interest in the work of his American pupils and friends. After giving me most valuable bibliographical indications, he says: "I am afraid I would not have time to look over my material and answer those questions intelligently. We are all working hard here. It is an awful business. One of the worst features is that it will dig an intellectual gulf between Germany and this country for generations. Let me have the results of your studies." May the great doctor's prophesy not come true and an early and lasting peace again unite the nations.

Professor A. Jacobi, that grand old man, eighty-five years young, sent me from his summer home a five-page letter, closely written in his own hand, giving me a wealth of information. At the end of this remarkable document full of bibliographical references and narrations from his own vast experience, he modestly says: "I am sorry I cannot contribute anything to your work, being in the country and having nothing in this desert that will add to your riches." Of course the good doctor refers to the riches of information I was supposed to have gathered from other sources since I

have confessed to having none of my own.

Many other letters began with the usual regret not to be able to answer all my questions or some of them, or even any at all, because of lack of statistics, but from what follows you will see that a goodly number of my correspondents have most kindly aided me by letting me have whatever statistics they had or giving me the general impressions resulting from their vast experience. Adding to this whatever important enlightenment I could find by the perusal of the more recent current literature, I believe I have after all been able to come to some conclusions, and from them we may perhaps be able to outline some effective measures to diminish the sources of infection and to prevent the tuberculous infection from becoming tuberculous disease.

The answers to my first question, concerning the frequency of tuberculosis in general in childhood, would give an average of about 36 per cent.

Prof. Norman Bridge, Los Angeles, gave it as	22%
Prof. S. Solis Cohen, Philadelphia, gave it as	10%
Dr. Alfred F. Hess, New York, gave it as	38%
Prof. Godfrey R. Pisek, New York, gave it as	65%
Dr. Bertram H. Waters, New York, gave it as	26%
Hamburger and Monti, in <i>Amer. Jour. of Dis. of Child.</i> , Vol. 9, No. 6, June 1915, gave it as	59%
Veeder and Johnston, in same issue, gave it as	34%

From the interesting opinions given in answer to this inquiry I desire to quote the following:

Prof. Vincent Y. Bowditch, of

Boston, thinks latent tuberculosis is more frequent in children than has hitherto been supposed, only to become active in young or adult life.

Prof. Edward O. Otis, of Boston, writes: "I believe a large number of children have a tuberculous infection but comparatively few develop active clinical pulmonary tuberculosis before adolescence. Such I should say had been my experience."

Prof. Wm. P. Lucas, of San Francisco, feels strongly that it is time to differentiate between infection and disease in children. He believes that most city children become infected and in most cases produce definite immunity.

Dr. Alfred Meyer, New York, thinks the percentage higher than usually supposed in febrile cases without superficial evidence, such as lymphad and joint lesions, and that these cases are wrongly regarded as typhoids (even three or four attacks).

Prof. John L. Morse, Boston, says tuberculous infection is of course very common while tuberculous disease is relatively rare.

Newsholme, in *Lancet*, June 12, 1915, in the section referring to inaccurate diagnosis in children, quotes striking figures from Coates and Landouzy on the question of the prevalence of tuberculosis in children and also in relation to deaths. He states that "In children the term broncho-pneumonia not infrequently conceals acute tuberculosis, especially when the 'broncho-pneumonia' occurs after imperfect recovery from such diseases as whooping-cough and measles."

Concerning the various ages at

which infection has most likely occurred, I received the following replies:

	Years.	
Dr. Alfred F. Hess,	Under 1,	5%
New York.....	1 to 2,	33%
	2 to 3,	75%

Prof. John L. Morse,		
Boston.....	Infection and disease	
	increase steadily with	
	age.	
	Year.	

Prof. Godfrey R. Pisek,	1st,	14%
New York.....	2d,	50%
	3d,	65%
	5th,	60%
	7 to 14th,	70%

Prof. Geo. M. Tuttle,		
St. Louis.....	Most frequent under	
	5 years of age.	

Prof. J. A. Miller and		
Dr. I. O. Woodruff		
(<i>Jour. of A. M. A.</i> ,		
March 27, 1909)....	In children of tuber-	
	culous parents who	
	live in close associa-	
	tion with them, be-	
	tween 2 and 15	
	years, 51%	

Prof. Hamburger of	Year.	
Vienna, in <i>Handbuch</i>	1st,	1%
<i>der Tub.</i> , Bd. V, 1915,	2d,	9%
gives the following	3d to 4th,	27%
table.....	5th to 6th,	51%
	7th to 10th,	71%
	11th to 14th,	94%

My own statistics re-		
veal the following...	Infection occurred ap-	
	parently in children:	
	Years.	
	1 to 5,	9%
	5 to 10,	34%
	11 to 15,	12%

Prof. Theodore Le Boutillier's remarks in answer to this question are likewise of intense interest. He says that he found that infection occurs with comparative infrequency during

early infancy when the child has been removed from the infected surroundings. He never found it to occur under these conditions. Where, however, the child remains in the infected surroundings, he thinks that, as a rule, these infants become actively tuberculous within the first year of life. It occurs most frequently during the second five years of life and then at puberty.

To the question which of the organs were most frequently involved, nearly all my correspondents united in the opinion that in children the lungs and lymph nodules were primarily and most frequently involved; secondly, bones; thirdly, intestines; fourthly, meninges.

I will quote from the remarks I received in answer to this question as follows:

Dr. E. R. Baldwin, of Saranac Lake, referred me to his article in Osler's System of Modern Medicine, last edition, in which he says: "In the majority, a previous focus must be regarded as essential although infection through the tonsils or by way of the cribriform plate of the ethmoid may be possible. The most frequent lesion is in the lungs (50 per cent.), glandular tuberculosis probably comes next in frequency, and then joint, bone, genito-urinary, and pleural lesions."

Prof. Theo. Le Boutillier, of Philadelphia, thinks that the younger the child the more likely it is to be meningitis, next in frequency miliary tuberculosis; in older children, pulmonary, glandular and bone.

Prof. Wm. P. Lucas says that acute tuberculosis, in his experience, is nearly always found in infancy and rarely

during childhood unless the infection is very virulent or quantitatively large. After five years of age the number of acute cases even of tuberculous meningitis or miliary tuberculosis diminish very rapidly. He has no absolute percentage from his own experience but thinks that practically all the infections are glandular, either peribronchial, peritoneal, or cervical and that the other forms of tuberculosis, bone, etc., are secondary to the glandular involvement.

Dr. Alfred Meyer has always been surprised at the comparative rarity of acute miliary and of meningitis considering the very favorable conditions for dissemination.

Prof. John L. Morse supposes that tubercular meningitis and miliary tuberculosis were always secondary to some previous infection.

As to the method of invasion, Prof. John Howland, of Baltimore, gave 95 per cent. through close personal contact with tuberculous individuals; Prof. Godfrey R. Pisek of New York 75 per cent.; Profs. Hermann M. Biggs and Henry D. Chapin of New York, William P. Lucas of San Francisco, and George M. Tuttle of St. Louis, concur in the opinion of Doctor Howland.

In our Health Department's clinics, Dr. Bertram H. Waters traced the majority of infection to the respiratory tract. My own statistics made me come to the same conclusion.

Somewhat divergent is the view expressed by Prof. Frank Billings of Chicago, who says that to him it seems that the most common source of the infection in the child and

adolescent is through the digestive apparatus, either from infected milk or other food substances or quite as frequently from actual contact with tuberculous adults and the contamination of hands, lips, etc., and with tubercle bacilli which gain entrance through the mucosa of the throat. He often wondered if this method of contact infection is not frequently present even in the adult rather than infection through infected air as is the commonly accepted mode. In other words, the last named mode of infection it seems to him is a very common one in both children and adults.

Prof. L. Emmett Holt, on the other hand, says that it has always been his belief that the dangers from tuberculous milk have been greatly exaggerated, certainly with infants and young children.

Prof. John L. Morse says that he has seen a considerable number of cases in which children with tuberculosis had taken the milk from tuberculous cows. He does not know, however, whether their infection was from the tuberculous milk or whether it was acquired in some other way.

As appertaining to this question we must add the following: Prof. William Charles White of Pittsburgh writes that in no way could he see that it is possible for us to trace the origin of infection from without although, in most of our general tuberculous cases, on which we have had autopsies, it is possible to trace infection from some glandular source of infection within the body.

Prof. Godfrey R. Pisek says, in-

fections with human bacilli, in all probability, are the latent types; the bovine type of infection does not seem to remain latent and to develop in later life; perhaps this type even confers a certain immunity.

Prof. Beverley Robinson of New York says: "The pulmonary organs are those most frequently involved, as I believe, and that is also the impression of very many general practitioners."

My question concerning the frequency of prenatal infection received the least number of responses. Prof. Norman Bridge thought he had seen two cases; Prof. John Howland also two cases; Prof. A. Jacobi reported one case. Myself I believe to have observed two distinct cases of prenatal infection. Professor Pisek believes that only fifteen authentic cases have been reported. And yet, it seems to me this rarity is perhaps only apparent and the reason for it is to be found in the fact that autopsies in children are not made nearly as frequently as in adults. There have been a sufficient number of cases on record, however, to make it necessary to consider this direct bacillary transmission from the mother as one of the means of tuberculous infection, particularly when the mother has been acutely ill at the time of conception or during pregnancy.

This prenatal infection may also explain the occurrence of tuberculosis in early infancy, that is to say before the first year. Gärtner, of Jena ("Ueber die Erbllichkeit der Tuberkulose," *Zeitschr. f. Hygiene u. Infektionskrankheiten*, Bd. XIII), who

made very extensive animal experiments in the endeavor to remove all doubts about this much disputed question, comes to the conclusion that the experiments with rabbits and guinea pigs disprove the possibility of the transmission of the tubercle bacillus from the father to the fetus. When bacilli are very numerous in the semen, the mother becomes infected but never the offspring. On the other hand, the clinical reports and his own animal experiments have convinced him that tubercle bacilli are frequently transmitted from the mother to the child during the latter's prenatal existence.

Some time ago I had the honor of a conversation with Prof. Wm. H. Welch of Johns Hopkins Medical School on the subject and he, too, was of the opinion that a direct bacillary transmission, that is to say, prenatal infection, takes place much more frequently than is generally believed.

Prof. S. Solis Cohen says it is difficult to distinguish between prenatal infection, hereditary tendency, and infection early in life. He does not see a sufficient number of very young infants to be able to exclude the latter method in any instance.

Prof. A. Jacobi says that while direct heredity is rare, hereditary predisposition to tuberculosis is quite frequent, and is transmitted even by such parents as appear to be in fair health. It is evident that the newly-born cannot be safe with its consumptive mother.

As to the certainty that predisposition is frequently inherited from a tuberculous mother or a tuberculous father, an anæmic parent, or parents

of feeble health or generally below par, there is of course not the slightest doubt. Any inherited systematic weakness of the child, which might be more properly called a physiological poverty, renders the child naturally more susceptible and less resistant to invasion of tuberculosis or other infectious diseases. When the mother is the tuberculous parent, this predisposition is all the more likely to be inherited because of the impregnation of the cells of the fetus by the toxins of the tubercle bacilli, even if the latter have not been found in sufficient numbers in the cells to demonstrate direct bacillary transmission.

To the question at what period of life a tuberculous infection, contracted in infancy or childhood, was most likely to become active, I received the following answers:

Dr. W. Jarvis Barlow, Los Angeles, at 15 years.
Prof. Hermann M. Biggs, New York, between 6 and 25 years.

Prof. S. G. Bonney, Denver, between 18 and 25 years.

Prof. Vincent Y. Bowditch, Boston, at 15 years.
Prof. Norman Bridge, Los Angeles, between 15 and 18 years.

Dr. E. S. Bullock, Silver City, N. Mex., between 18 and 25 years.

Prof. Theo. Le Boutillier, Philadelphia, at 15 years.

Prof. Wm. P. Lucas, San Francisco, at 15 years.
Dr. Alfred Meyer, New York, at 10 years.

Dr. Charles L. Minor, Asheville, before 16 years.
Prof. Wm. P. Northrup, New York, between 3 and 12 years.

In my own experiences, I found that early infection had become active between 10 and 30 years.

The remarks on this question are significant and I will quote the following:

Dr. Alfred F. Hess, of New York, does not believe that the age is such an important factor as regards making an inactive process active, as is the general condition of the individual. Independent of age, if a person has measles, marked anæmia, or malnutrition from whatever cause, there is liability of the lighting up of the tuberculous focus.

Dr. G. W. Holden, of Denver, thinks a latent infection will not develop until such a time as the natural resistance has been broken down and vitality lowered, due to overwork or overplay, or a combination of both.

Prof. L. Emmet Holt, New York, thinks that age seems to have much less influence on this point than other conditions, such as season of year—winter and spring—and the development of intercurrent diseases such as measles, whooping-cough, influenza, and bronchitis.

Dr. David R. Lyman, of Wallingford, Conn., says that his own general impressions based chiefly upon the histories of his cases is that where an intelligent history is obtainable a very large percentage of our adult cases can be traced back to early youth or childhood, and that our future work must be devoted mainly to the prevention of tuberculosis in childhood.

Prof. Wm. Chas. White thinks that there is no period in life when tuberculosis may not be contracted.

Prof. Godfrey R. Pisek thinks the period of life in which latent tuberculosis is most likely to become active begins about the fifth year; this includes no observations after the fourteenth year of life.

To my last question, what was the age at which tuberculosis was found most frequently in the adolescent and the adult, I received the following answers:

Dr. W. Jarvis Barlow, Los Angeles, gave the age at	Years. 20 to 29
Prof. Hermann M. Biggs, New York, gave the age at	16 to 25
Prof. Frank Billings, Chicago, gave the age at	15 to 25
Prof. Vincent Y. Bowditch, Boston, gave the age at	20 to 40
Dr. E. S. Bullock, Silver City, N. M., gave the age at	18 to 25
Dr. G. W. Holden, Denver, gave the age at	20 to 25
Prof. S. Solis Cohen, Philadelphia, gave the age at	18 to 22
Dr. Alfred Meyer, New York, gave the age at	15 to 40
Dr. Chas. L. Minor, Asheville, gave the age at	20 to 40
Prof. Edw. O. Otis, Boston, gave the age at	18 to 35
Dr. Bertram H. Waters, New York, gave the age at	25 to 40
Prof. Wm. Chas. White, Pittsburgh, gave the age at	20 to 40
In my own experience I found tuberculosis to be in evidence most frequently between	15 and 40

Of 1,000 private cases of adults of which I kept careful records, only 14.5 per cent. recalled an evident exposure to infection outside of their family circle during their adult existence as a possible cause of their disease. On the other hand, 33 per cent. stated that either father, mother, brother, or sister had died of tuberculosis or had been ill with the disease. In these cases we have reason to believe that infection occurred most likely during infancy or childhood.

The general impressions which were kindly given me by my correspondents

concerning my inquiry as to when a tuberculous infection became a tuberculous disease, or when the disease was first noticed in the adolescent or the adult, are to my mind fully as valuable as the statistical data.

Dr. Herbert M. King, physician-in-chief of one of our largest sanatoria where the vast majority of patients come from the well-to-do classes, writes as follows: "Speaking very generally, I think I share a widespread impression, amounting to almost conviction, that most of the cases of tuberculosis developing in adult life may be traced to infection received before adolescence."

Dr. Lawrence F. Flick, of Philadelphia, says: "From my experience in tuberculosis and from the studies I have made of the subject, I am led to believe that ordinary tuberculosis is implanted in early life and either remains dormant or grows very slowly until adult life is reached. My histories of cases taken as a whole would indicate that ordinary tuberculosis has existed for many years when a case comes under observation for the first time. The implantation undoubtedly most frequently takes place in the home through prolonged intimate contact with an open ulcerative case of tuberculosis in the intimacy of family life."

Prof. Wm. C. Hollopeter, of Philadelphia, writes: "I am a great believer in the early implantation of tuberculosis in children and believe that all children have it with very rare exceptions, the adult form is simply a recrudesence, or an expression due to lowered resistance of the individual."

Prof. John Howland, of Johns Hopkins, says: "We have had, in the dispensary and hospital, since I have been in Baltimore, 8,293 patients. Of these, 469 had tuberculosis recognizable in some form or other and we have not made the diagnosis of tuberculosis unless, in addition to the symptoms, tuberculin tests showed the presence of the disease. I have not included in this those patients, that, without other evidences of tuberculosis, gave positive von Pirquet reactions."

Dr. Martin F. Sloan, Superintendent of the Maryland State Hospital for Consumptives, writes: "I do not remember having seen one adult with a so-called acute invasion in whom a chronic lesion was not demonstrable in one of the apices. My limited experience leads me to believe that practically all cases of pulmonary tuberculosis in the adult are of endogenous origin. A carefully obtained history from an observing patient most frequently reveals one of a number of several manifestations of tubercle bacilli infection in early life, viz., nasal catarrh or middle ear trouble, tonsils and adenoids, 'white swelling,' malnutrition, 'winter colds,' enlarged cervical glands, at puberty, amenorrhœa, or irregular menstruation, nervousness, and poor development; and later, pleurisy, chronic bronchitis, 'typhoid pneumonia.' In other words, we find stepping stones, if you will, connecting an infection in early childhood with the pronounced case of consumption in adult life. This leads me to say, parenthetically, that I consider the critical periods of a woman's life, in so far as tuber-

culosis is concerned, are puberty, puerperium, and the climaterix; of a male's puberty, and about thirty to thirty-five years.

"Again, a careful history nearly always shows that at least one brother or sister, or maybe more, has had suspicious symptoms. I know several families that have been exterminated by consumption, though the members had been separated since childhood, all of which would seem to indicate an infection through a common carrier in early life, very likely a parent, nurse, or housemaid.

"On the other hand, I know of no employee about the sanatorium who has become a victim of the disease. After seven years' exposure I myself show no signs or symptoms of the disease. I must confess I am somewhat dubious of the frequency of adult infection, except in cases of the closest contact, such as is to be found in marital life."

Dr. Charles L. Minor, of Asheville, writes: "In my own experience I have found in the adolescent, the largest number of cases of tuberculosis appearing at about sixteen. In the adult the large majority have been between twenty and forty."

Prof. Wm. S. Thayer, of Baltimore, wrote: "As time has gone on I have been very much impressed in a purely general way with the feeling that most tuberculosis was acquired in childhood, but, alas, when it comes to a question of proof or even of strong evidence to support my feelings, I have it not. I have a very general feeling that glandular tuberculosis is especially common in childhood and

I would be inclined to believe that most pulmonary tuberculosis was rather largely an autogenous infection from such early glandular foci, but, as I have said, I cannot feel that I am justified in expressing more than an impression with regard to the question. I shall be much interested to see your final conclusions."

Prof. John L. Morse, of Harvard Medical School, writes: "Both tuberculosis infection and tuberculosis disease are far more common among the poorer classes than among the well-to-do."

This statement that tuberculosis infection as well as tuberculosis disease is the lot of the child of the poor is borne out by the statistics furnished me, particularly those of Dr. Alfred F. Hess, who writes: "Among the children at the Infant Asylum who may be considered about the average of those living in the tenements, we have found that three-fourths of those under the age of five years give a positive von Pirquet test."

In these children, 75 per cent. means not infection but tuberculous disease, more or less active, for below the age of five the infection has rarely had a chance to become latent and the slightest additional pathological process, such as measles or anæmia, or simply malnutrition, is sufficient to produce a general and often fatal tuberculosis.

To make a brief summary of results from this little study, we would have to say that tuberculous disease in childhood, compared with tuberculous infection, is relatively rare (36 per cent.); that, on the other hand,

tuberculous infection is exceedingly frequent, generally speaking, and, according to exact statistics as well as general impressions given by men of vast experience, the majority of the cases in the adult had their origin in an infection during infancy or childhood.

The frequency of infection increases with the age of the child, and of course is also affected by the environment the child comes from.

	Percentage.	
	Lowest.	Highest.
Under 1 year,	1%	9%
From 1st to 3d year,	9%	50%
From 3d to 5th year,	27%	75%
From 6th to 10th year,	34%	75%
From 11th to 15th year,	(private) 12%	(hospital case) 94%

As to what organs are primarily most frequently involved, statistics and impressions give lungs and lymph nodules. Prenatal infection, while considered rare, is perhaps much more frequent than statistics show.

The age at which a tuberculous infection, contracted in infancy or childhood, becomes active is, according to the majority of my correspondents, at or shortly after fifteen years; next between eighteen and thirty years.

The ages at which tuberculosis was diagnosed and apparently contracted most frequently in later life, were given as most frequent between twenty and thirty-five years.

Nearly all the authorities consulted unite in the opinion that, in order to combat tuberculosis successfully in the young and the old, we must diminish the sources of infection in childhood.

And now, in conclusion, let me rapidly enumerate the measures which I hope and believe may tend to diminish this frequency of infection and when it does occur prevent the disease from developing.

(1) We must seek to amend the federal and state laws which make it a criminal offense for a duly licensed physician in good standing to give advice concerning the means of preventing conception. We must be allowed fearlessly and openly to instruct tuberculous parents how not to procreate a tuberculous race.

(2) All cases of open tuberculosis, particularly the pulmonary and laryngeal types, should be required by law to be reported to the health authorities who in turn should be authorized to send the patient directly, or through the attending physician, carefully worked out instructions to prevent infecting others.

(3) Cases which cannot be properly taken care of in the home, or when it is evident that they constitute centers of infection, should be transferred to sanatoria, special hospitals, or at least to special wards in general hospitals. Every community should have sufficient facilities to take care of such cases. The board of health of every community should have police power in order to be able to isolate such cases which wilfully disseminate bacilli by indiscriminate expectoration or by other unclean habits, thereby exposing other members of the family, particularly children, to contracting the disease.

(4) For the pregnant tuberculous woman there should be a maternity

sanatorium or a special ward in existing maternities where prolonged antituberculosis treatment can be effectually carried out and where mothers can receive such instructions as will guard their offspring from post-natal infection.

(5) Where there is the slightest suspicion of tuberculous infection of the infant by the mother, the child should have a healthy wet-nurse or should be bottle-fed. The preparation of the milk and bottles, testing the milk to judge of its sweetness and temperature, etc., should be attended to not by a tuberculous mother but by an intelligent and conscientious healthy person, unless the mother is scrupulously clean and knows how to take every proper precaution against infection. For infants whose mothers for one reason or another are unable or not intelligent enough to care properly for their tuberculous offspring, there should be established special preventoria. The need of such institutions has been very ably set forth in a recent contribution by Dr. Alfred F. Hess of New York, entitled "The Neglect to Provide for the Infant in the Antituberculosis Program."*

(6) Enterprises similar to the one inaugurated by my regretted teacher, the late Professor Grancher of Paris, for the purpose of providing medically supervised country homes for the tuberculous mothers and their children until they can safely return to city environments, should be helped by private philanthropy, or, better yet, by the aid of the municipality.

(7) All children under five years of

age, be they of poor or rich parentage, should be subjected annually or even semi-annually, to the von Pirquet test, and all who react positively and have in addition symptoms and physical signs should be placed under proper treatment at home, in preventoria, or sanatoria.

(8) All children between five and fifteen years of age, particularly those attending public schools, should be subjected to a careful physical examination on entering as a pupil and an annual reexamination thereafter, always accompanied by a von Pirquet test. Those reacting positively and showing physical signs, those evidently strongly predisposed to tuberculosis, anæmic, highly nervous or afflicted with cardiac disease, should, according to their condition, be placed in open-air classes, open-air schools, preventoria, seaside or inland sanatoria. This will probably mean that open-air schools must become the rule and the indoor class the exception which indeed would be a great blessing. It goes without saying that all physical defects, such as adenoids, enlarged tonsils, deviated septi, must be removed so that the child's upper respiratory tract may be as nearly perfect as possible. Defective hearing and eye-sight, as well as bad teeth, must, of course, also receive proper attention.

(9) Open-air instruction should be practised whenever feasible. Singing, recitation, geology, botany, etc., should be taught out-of-doors. Calisthenics, breathing exercises, and swimming lessons should constitute a part of the curriculum of every public and private

* *Jour. Amer. Med. Ass'n*, Dec. 19, 1914.

school. No public school should be without its swimming pool. A drill in swimming so as to know how to save one's own or perhaps other lives, should be as essential as fire drills in public schools. Wherever shower baths and swimming tanks (the former to be used prior to entering the latter) form a part of the public school equipment, pedagogues have observed a better morale and better work done by the pupils. The curriculum of our schools should be arranged so that the mental and intellectual training is not carried to the extent of becoming detrimental to the physical development and well-being of the children.

(10) The school authorities should have the right to investigate the home of any child attending public school when the teacher or school physician thinks that underfeeding, bad sanitary home environments, or child labor at home, are responsible for a poor physical condition of the pupil which might develop into tuberculosis.

(11) Child labor in factories, mines, canneries, stores, workshops, in the street or at home, must be done away with if we wish to raise a non-tuberculous race. Up to the age of fourteen every boy and girl should have the right and privilege to play and not be forced to work. When arriving at the age of puberty, the boy or girl should be in the best possible physical condition or else there is a great likelihood that a latent tuberculosis or inherited predisposition will develop into tuberculous disease. Playgrounds and parks should be in abundance in every civilized community. The roofs of schools and tenements should be

converted into roof gardens when the ground is scarce and expensive, as for example in New York City.

(12) There should be an obligatory examination for tuberculosis and other serious diseases of every boy or girl prior to entering college, the store, the workshop, the office, mine, factory, or any occupation for his or her career in life. The physical and mental test at such a time should be used as a guide in the choice of trade or profession.

(13) There should be periodical examinations for tuberculosis of all employees in whatever sphere of activity—in office, factory, workshop, hotels, households, schools, municipal or federal departments, etc.

(14) For those weeded out as tuberculous or afflicted with other diseases which incapacitate them for their usual work under ordinary conditions, there should be agricultural and industrial colonies where these semi-invalids will have nevertheless an opportunity to earn a livelihood. There also the graduates from sanatoria should be sent for an opportunity to regain strength and vigor, to make their cure more lasting, and above all to learn again to earn their living.

(15) There should be state insurance or obligatory private insurance against accident, old age, and diseases including tuberculosis for all earning less than \$1,000 per annum, so that those fearing temporary or total loss of earning capacity will not be afraid to seek proper treatment in tuberculosis institutions.

(16) Although the investigations, the replies from eminent authorities,

and the literature consulted seem to show that the bovine type of the bacillus of tuberculosis at a maximum estimation is not responsible for more than 10 per cent. of tuberculosis in childhood, we must not allow ourselves to lessen our efforts to combat the disease in animals. We should not have individual and widely differing state laws but instead uniform bovine laws enforced by federal authorities in all states of the Union alike. Only thus will we be able to combat the source of infection for human beings which comes from the bovine race.

(17) With all this there must be a continued propaganda for the education of the masses concerning the prevention of tuberculosis, alcoholism, and other social diseases; for the improvement of housing conditions including the supervision and better sanitation of city and country schools, of lodging houses, boarding houses, factories, workshops, stores, offices, asylums, prisons, and reformatories; for the prevention of injurious overwork; for healthful recreation of the masses in city and country; for the return to the soil from our overcrowded cities; and above all, for a living wage for all who labor honestly and efficiently and a rational and speedy solution of the problem of unemployment.

I grant that this is an elaborate and extensive program, but if you take into consideration the financial sacrifices this nation is annually making to combat tuberculosis, you will perhaps see the justification of it. In spite of all our efforts, we are still losing about 200,000 people annually

from tuberculosis in the United States, of which, I venture to say, 50,000 are children. Estimating the average duration of life of these 50,000 children at about seven and one-half years, and figuring the cost to parents and the community for each life as only \$200 per annum, the financial loss thus represented is \$75,000,000. These children have died before they have been able to give any return to their parents and the community. What a useless sacrifice of life and of money! How much needless sorrow and heartaches caused to parents!

Besides all this, many a tuberculous mother has had her life shortened because she bore one of these children. According to the report of the Commissioner of Education, there are at this time about 20,000,000 children attending public schools in the United States. Placing the proportion of tuberculosis among them as low as only 3 per cent., would make 600,000 children afflicted with tuberculosis who are at this time in urgent need of open-air instruction or sanatorium treatment. According to available statistics, we can at present provide instruction in open-air classes for about 2,000 tuberculous children. The anæmic, the nervous, and the children suffering from cardiac diseases, who are in equally great need of outdoor instruction, are not included in the 3 per cent.

The 150,000 adults who die annually of tuberculosis have on the average been ill and incapacitated for work for at least two years, and figuring their cost to the commonwealth (either to municipality or individual family) at

only \$1,000 per year, would mean \$300,000,000 uselessly spent in caring for people afflicted with a disease that might have been prevented or cured. Of these 150,000 adults, a large number have been married and in many instances leave either widow or orphans depending upon public support. The annual maintenance of these widows and orphans must, of course, also run into the millions. We have thus an annual expenditure of well-nigh \$400,000,000. Yet this by no means represents all the actual loss to the community from tuberculosis. Our social economists tell us that between the ages of sixteen and forty-five every adult life with an average earning capacity represents an asset of \$5,000 to the community. Now, as two thirds of all deaths from tuberculosis in adults occur between these ages, we have an additional loss of \$500,000,000. Thus, the actual direct and indirect loss caused by deaths from tuberculosis in the United States amounts annually to something like \$900,000,000, and this amount we spend on a preventable and curable disease!

We must also bear in mind the fact that we have at least eight times 150,000 tuberculous adults, for it is well known that for every individual who dies of tuberculosis there are eight living with the disease, still up and about, and the majority of them with an opportunity of spreading infection. Besides these, there are 400,000 to 600,000 tuberculous children. By reason of lack of open-air schools, preventoria, sanatoria, special hospitals, and horticultural, agricul-

tural and industrial colonies, the vast majority of nearly 2,000,000 tuberculous individuals continue the chain of infection and keep up our fearful morbidity and mortality at an expense of \$900,000,000 per annum.

To carry out the program I suggest will not cost us \$900,000,000 a year. If at first it should even approach this vast sum, within a very few years the expenditure as well as the morbidity and mortality from tuberculosis will be reduced to a minimum.

This little study, inadequate and doubtlessly defective in some respects, has nevertheless convinced me that there never will be a solution of the tuberculosis problem if we do not attack tuberculosis in infancy and childhood. This must be done first by diminishing the sources of infection; secondly, by curing the curable.

While I am willing to grant that an early and benign infection may be an immunizing factor, we know that it is neither universal, permanent nor complete, hence we must spare no efforts to diminish all sources of infection. It is the safer way. The measures outlined will prevent a benign infection from becoming disease and render the young child or adolescent more immune to future infections by increasing the natural resistance. The most expedient way to carry out the suggested program would of course be by a Federal Commission of Tuberculosis which I have ventured to suggest a number of times, but the need of which has been set forth recently and most convincingly by Lee K. Frankel, Ph.D., sixth vice-president of the Metropolitan Life Insurance Company.

in a paper entitled "A Plea for a Federal Commission on Tuberculosis." This paper was read before the Mississippi Valley Conference on Tuberculosis, September 30, 1915. This conference, as well as the South Atlantic, New England, and North Atlantic Tuberculosis Conferences, has unan-

imously adopted resolutions endorsing such a commission. The child of today is the man of tomorrow. If we wish to have a non-tuberculous race, a nation stronger physically, mentally, and morally than we have ever had before, the solution of the tuberculosis problem will bring us nearer this goal.

APPENDIX.

Since the above paper was sent to the AMERICAN JOURNAL OF PUBLIC HEALTH for publication, many other answers to letters of inquiries have come in and important events have transpired which made a revision with some changes and additions necessary and advisable in order to bring this contribution up to date. Among the events which happened was a remarkable address on The Control of Tuberculosis by Doctor Heiser at the Second Annual North Atlantic and New York State Conference on Tuberculosis which was held in Albany on November 4, 1915, and to which it was my privilege to listen.

Dr. Victor C. Heiser, formerly Chief Health Officer of the Philippine Islands, now the Director for the East of the International Health Commission of the Rockefeller Foundation, who had just returned from a visit to Australia, told us that in Victoria, Australia, tuberculosis was virtually stamped out and that this had been done by the simple method of having every tuberculous case reported and every individual afflicted with tuberculosis treated. If the authorities had convinced themselves that the patient did not constitute a center of infection in his home and had a reasonable

chance of becoming cured (that is, if he had an outdoor sleeping porch and obeyed all prophylactic and curative measures) he was allowed to remain there. If, after investigation, the sanitary officers become convinced that a patient cannot be treated safely at home, he is compelled to enter an institution. If the patient is the bread winner of the family and of no means, and his sick and invalidity insurance is insufficient, the municipality assumes the responsibility of taking care of the family until the breadwinner is restored to his earning capacity. Children, when tuberculous, are being taken care of in the same way as the adults.

In our large congested American cities, as for example in New York, with our heterogeneous population, our social conditions and economic laws so vastly different from Australia, it may seem ludicrous to expect that anything like their method could be inaugurated. Yet I believe that by a united effort on the part of our statesmen to bring about insurance against disease, including tuberculosis, by the enforcement of antituberculosis laws and regulations in a strict but humane way such as is outlined in the above article, and lastly, by the aid of philanthropists to improve

the general housing and working conditions of the masses, the tuberculosis problem might be solved in the United States as well as in Australia, and in less time than might be thought possible. It needs a wise philanthropy, a just government, unselfish and enlightened statesmen, practical and expedient municipal laws, well-trained sanitarians and physicians, and an intelligent people to gain the victory over the great white plague.

The concluding sentence of Doctor Heiser's address may be well worth repeating here: "If it is possible for Australia to effectually combat tuberculosis, why should it not be possible for the United States to do so?"

The Metropolitan Life Insurance Company, which has already done so much toward educating the people in public health measures, and particularly in the prevention of tuberculosis, by its visiting nurses, by distributing educational leaflets to its policyholders and the public at large, and which has also shown its great interest in the cure of the tuberculous by establishing an ideal sanatorium at Mount MacGregor for its tuberculous employees, is evidently of the same opinion as Doctor Heiser. This great company is willing to give the method a trial, and has generously donated \$100,000 so as to imitate the Australian experiment in the United States. This sum was offered officially to the National Association for the Study and Prevention of Tuberculosis at its Meeting in Washington, May 11 of this year, 1916, and gratefully accepted for the purpose designated by the directors of the

Metropolitan Life Insurance Company.

It is planned to select a town or city of about 5,000 inhabitants, probably in New York or Massachusetts, and to apply there all of the knowledge on the treatment and prevention of tuberculosis available, with a view to the ultimate eradication of the disease. The following conditions will govern the selection of a city:

- (1) The community must be one approximately 5,000 population.

- (2) The composition of the population must be of a mixed character, racially, industrially, and socially.

- (3) It should preferably not be a one-industry town, but should have several industries.

- (4) The community must *welcome* the experiment and must promise co-operation of physicians, health boards, mayor, councils, and other civic, social, and industrial groups.

- (5) It is the purpose of the experiment to attempt to show the community selected how, with proper direction, it can stamp out tuberculosis from its midst. To this end, the city or town should have access to certain agencies and institutions which can and will coöperate in the work. Such agencies as a county or city tuberculosis hospital, a tuberculosis clinic, open-air schools, visiting nurses, organized relief-giving agencies, etc., will be invaluable to the success of the community experiment.

The following are the resolutions which were adopted by the Association in accepting the \$100,000 gift:

"The National Association for the Study and Prevention of Tuberculosis

expresses its hearty appreciation of the generous proposition of the Metropolitan Life Insurance Company to contribute \$100,000 for conducting a community experiment in the control

of tuberculosis. In undertaking this trust the Association hopes that the results of the experiment may be commensurate with the desires which inspired the offer."



PLAGUE.

It is a remarkable fact, confirmed by many observations, that many physicians who have devoted considerable labor to the study of a particular disease have themselves died of that disease. One of the most interesting examples is that of John Daniel Major, born August 16, 1634, in Breslau, a physician and naturalist of no mean ability. Bitten early by the wanderlust, he studied at Wittenburg, took courses at many of the schools in Germany, and finally went to Italy where he received the degree of doctor of medicine at Padua in 1660. Returning to his own country, he resided for a short time in Silesia, and in 1661 married at Wittenburg, Margaret Dorothy, a daughter of the celebrated Sennert. The following year, his young wife was stricken with plague and died after an illness of eight days. Distracted by his loss, Major wandered up and down Europe studying plague wherever he found it in the hope that he might discover a cure for the disease which had bereaved him. Spain, Germany, France and Russia were visited by him. He settled in 1665 in Kiel, where he was made professor of botany and the director of the botanical gardens. He made frequent voyages, however, always in quest of the remedy for plague. Finally in 1693, he was called to Stockholm to treat the queen of Charles the Eleventh, then ill with plague. But before he could render her any service, he contracted the disease and died on the third of August.

The bubonic plague of today is identical with the black death of the Middle Ages. Primarily a disease of rodents caused by a short dumb-bell shaped microscopic vegetable, the pest bacillus, it occurs in man in three forms: the pneumonic, which has a death-rate of almost 100 per cent.; the septicæmic, which is nearly as fatal, and the bubonic in which even with the most modern methods of treatment the mortality is about 50 per cent. It is a disease of commerce, spread-

ing around the globe in the body of the shipborne rat. It is estimated that every case of human plague costs the municipality in which it occurs at least \$7,500. This does not take into account the enormous loss due to disastrous quarantines and the commercial paralysis which the fear of the disease so frequently produces.

The disease is now treated by a serum discovered through the genius of Yersin. This is used in much the same way as is diphtheria antitoxin.

Plague is transferred from the sick rodent to the well man by fleas. The sick rat has enormous numbers of plague bacilli in its blood. The blood is taken by the flea which, leaving the sick rat, seeks refuge and sustenance on the body of a human being to whom it transfers the infection.

Since plague is a disease of rodents and since it is carried from sick rodents to well men by rodent fleas, safety from the disease lies in the exclusion of rodents, not only exclusion from the habitation of man but also from the ports and cities of the world. Those who dwell in rat-proof surroundings take no plague. Not only should man dwell in ratproof surroundings, but he should also live in ratfree surroundings. The day is past when the rodent served a useful purpose as the unpaid city scavenger. Rats will not come where there is no food for them. Municipal cleanliness may be regarded as a partial insurance against plague. The prayer that no plague come nigh our dwelling is best answered, however, by rat-proofing the habitations of man. Modern sanitary science has evolved a simple and efficient weapon against the pestilence which walketh in darkness and striketh at noonday, and the United States Public Health Service has put this knowledge into practical operation and thus speedily eradicated plague wherever it has appeared in the United States.

THE EFFICIENCY OF VENEREAL CLINICS.

SUGGESTED REMEDIES FOR PRESENT DEFECTS.

PHILIP S. PLATT,

*Superintendent, Bureau of Public Health and Hygiene, New York Association
for Improving the Condition of the Poor.*

One million, two hundred and fifty thousand individuals were treated in one hundred and twenty-two clinics in New York City in 1913 for venereal disease, yet in most of these clinics one could not determine the results of such treatment. Mr. Platt in this paper criticizes the filing systems in general use in these clinics and suggests a remedy in the form of a cross indexing by diseases.

A FLEET of battleships once steamed forth to target practice. Throughout the day they fired fast and furiously. On the success of the gunners depended the great fleet's value as an offensive and defensive weapon. The results were anxiously awaited. At length the report was made: some hundreds of shells had been fired; some thousands of dollars worth of explosives had been expended. But of hits, there was no mention! No record of hits had been kept.

A similar story might be told of practically every clinic and dispensary in New York City. Although, according to the report of the State Board of Charities, a million and a quarter individuals were treated in 122 public and private dispensaries (or out-patient departments) in 1913, *with what results* they were treated, no one can say.

Consider that in these 122 dispensaries some 5,000 physicians are giving their valuable time, that a multitude of attendants, nurses, and clerks are

employed, that the 3,000,000 odd prescriptions that were filled represent the expenditure of hundreds of thousands of dollars for medicine. Then reflect that, in all but a very few dispensaries, the only information that is requested by the boards of managers and furnished by the clinic chiefs and dispensary superintendents, is the number of persons treated, the number of treatments given and the number of prescriptions filled—information of no significance from the point of view of clinic efficiency. How long would such conditions be tolerated in a bank or a railroad? It is true that some patients may be incurable, others perhaps quite undesirable. But, unless a dispensary is blind to its social responsibility, it must regard each new patient not merely as an interesting or an uninteresting case, not merely as one of many awaiting treatment, but as a *liability* in its account with society—a liability which will remain unsettled until the patient has been returned to society, cured of his ail-

ment, or satisfactory explanation made of the failure to do so. Only with such an ideal can a dispensary rise to the great field, which as yet it imperfectly fills.

But how admit success or failure when there is no accurate knowledge of what has been done? That this lack of reliable data is a common condition in genito-urinary clinics as well as in other clinics may be clearly shown.

As a part of a coöperative program with the Society for Sanitary and Moral Prophylaxis, the American Social Hygiene Association, and the Associated Genito-Urinary Clinics, of the city of New York, the Bureau of Public Health and Hygiene of the New York Association for Improving the Condition of the Poor visited twenty-seven genito-urinary clinics. With one partial exception, it was unable to discover that such information as the percentage of gonorrheal patients cured, the percentage ceasing treatment improved, the percentage ceasing treatment unimproved, the number of visits per patient, the number of patients coming once and never returning, indeed, even the number of patients treated per month, had ever been recorded in any of these clinics. In some clinics the determination of such facts would have been an absolute impossibility, in many it might have been secured only after many weeks of labor and handling of some 50 to 100,000 irrelevant cards; in a few it could be determined comparatively simply.

The difficulty generally lay in the filing system. As a rule, a case-history

card, filled out at the first visit and sent to the central file of the dispensary remains there in unbroken rest until the patient himself returns to claim it and put it in the physician's hands. If the patient at any time ceases to come, no one is the wiser. In such a filing system, by far the most common, is hidden alike the fruitful and the barren work of the clinic. The remedy is exceedingly simple. A cross-index by diseases would change a great sarcophagus of records into a vitally important, active file. In a mere handful of cards, representing the possible diagnoses of a dispensary, the filing number of every patient's history card would be found according to diagnosis. A clinic chief could then ask the dispensary registrar to send him his gonorrheal, or his scoliosis, or his adenoid cases for any desired period, and in a short time a complete analysis of his work could be had.

This is what we found through the generous coöperation of the chiefs of four genito-urinary clinics that stand well among the best, in our analyses of the gonorrheal patients during the course of a year: 8 per cent. of the patients were recorded *discharged* as *cured*; 17 per cent. ceased treatment of their own accord, *improved* in condition but *not* cured as determined by clinical signs and complement fixation tests; 75 per cent. *ceased treatment unimproved*. This is profoundly interesting. Only 8 per cent. cured, 17 per cent. improved but still probably carrying the infection, 75 per cent. unimproved. These 75 per cent. made 50 per cent. of the total visits to the clinic. What a surprising

amount of wasted effort on the part of the physician, wasted time on the part of the patient, wasted money and opportunity on the part of the clinic. But how many clinics, other than genito-urinary, know from a study of their records whether they can make a better showing?

How can this be? One explanation may be found by determining the number of visits actually made by each patient, or better, the percentage of patients making one, two, three, four, etc., visits. It appears that 28 per cent. made one visit; 11 per cent. two, 7 per cent. three, 6 per cent. four, or 52 per cent. less than five visits. Otherwise expressed, the middle or median man made between three and four visits. In the treatment of gonorrhea others more capable may decide how many visits are generally necessary before complete recovery, but surely very few patients are cured in less than five visits. It is significant that the middle or median man among those discharged as cured in these four clinics made between sixteen and twenty visits, the median man among those ceasing treatment improved, made between ten and fifteen, the median man among those ceasing treatment unimproved, made two visits.

Such a serious situation suggests a number of questions. Do they cease of their own free will? Or are they not encouraged to return? Would they return if made to see the necessity of so doing? Or do they come once simply to secure alleviation of the more distressing symptoms? Can a clinic afford to throw away half of its

time? Or shall we say it is not being thrown away? Is the idea that people really want to be cured and will do their part, if given an opportunity, erroneous? Must we "social service" them in the highways and byways,—a sort of forced conscription for medical treatment?

These questions are raised to suggest that the return of patients is not necessarily a simple, automatic affair. And yet with the introduction of a simple postal card follow-up system at the Boston Dispensary no less than 50 per cent. of those not returning of their own accord responded to the first postal that was addressed to them. At the genito-urinary clinic, Brooklyn Hospital Dispensary, 62 per cent. have responded to postals by presenting themselves for further treatment, or by giving adequate excuse for not returning. With such results as an example, what valid excuse is there for a genito-urinary clinic allowing over half its gonorrheal patients to make less than five visits?

Until the clinic chiefs, the dispensary superintendents, the boards of governors know in numbers and percentages what the facts are, the stimulus to improve and the accurate knowledge of improvement will be lacking. Let the clinic books be balanced, as it were, monthly, quarterly or yearly. Much is being put in, how much is being got out? If the dispensary really has a social responsibility for doing the utmost for the man that seeks, however faint-heartedly, to be cured, let no stone be left unturned, or follow-up system left untried, to effect that cure. If the numbers are too great for effect-

ive work, let one hundred men be treated efficiently, rather than three hundred inefficiently.

The much-abused, and neglected, so-called, hospital annex—the dispensary—fairly bristles with problems, social, charitable, administrative, ethical, therapeutic, educational, economic, and financial, as the Associated Out-patients Clinics has well pointed out. No attempt is made in this paper to discuss these problems. Be it said, however, that following the successful example of Michael M. Davis of the pioneer Boston Dispensary and Doctor Thompson of the Brooklyn Dispensary, the Society for Sanitary and Moral Prophylaxis, with the coöperation of this Bureau and other organizations, has planned the establishment in New York City of a pay evening venereal disease clinic for men, with paid physicians, social service worker with follow-up system and strict clinic accounting—the whole

experiment to be placed on a self-supporting basis.

Already the beneficial effect of our studies may be clearly seen in the venereal clinics where they were undertaken, while the improvement in physical standards of equipment has been recently urged by the Associated Genito-Urinary Clinics. But until the knowledge of existing conditions, and of results accomplished, becomes an essential part of the operation of a clinic, the efficiency of venereal clinics must necessarily be low. On the other hand, a simple cross-index by diseases will make it possible for such information to be readily available. A wide-awake clinic chief will never be satisfied with such conditions as he will find. To remedy them he will see the necessity of a follow-up system which will bring the patients back and when this is done a long step toward clinic efficiency will have been taken.

APPENDIX.

*Analysis of Gonorrheal Patients
Treated at Four Genito-Urinary Clinics in New York.
Period—One Year.*

	Discharged as cured.*	Ceased treat. improved.†	Ceased treat. unimproved.‡	Total.	Per cent.
No. of patients	67	146	641	854	100
Percentage	8	17	75	100	
No. visits	1,305	2,231	3,432	6,968	
Average number visits	19	15	5	8	
Median man visited	16-20	11-15	2	4	
Percentage total visits	19	32	49	100	
Percentage making 1-4 visits	0	11	66	52	
Percentage making 5-10 visits	22	28	18	20	
Percentage making 11 and over visits	78	61	16	28	

A patient was declared:

*Dismissed as cured—when his history card so stated. This was done when there was a complete absence of discharge after the beer test, the urine was repeatedly clear, and no gonococci could be found. A negative complement fixation was required in one and was optional in the remaining clinics.

†Ceased treatment improved—when his history card showed that improvement had been made at time of the last visit, as judged by absence of discharge (whether only temporarily or permanently was not known), improvement in urine, and a smear for gonococci, if taken, showing negative. In this group are undoubtedly some who on their next visit would have been declared cured, while it consists for the most part of those who, while improved so far as symptoms are concerned, are quite possibly still harboring the gonococci and are consequently a particular menace to society.

‡Ceased treatment unimproved—when his history showed practically all the original symptoms in an active condition.

A period of six months elapsed between the date of admittance of the last patient and the analysis of the year's record.

The Diagnostic Cross-Index of Dispensary Case Histories.

WHAT IT CONSISTS OF.

A drawer of cards like this with guides bearing any sub-classification desired:

Diagnosis: Gonorrhea, Ant. Doctor* Smith 1915

Sept. 14,421, 14,470, 14,501

Oct.

*Or clinic, where patient is treated by different doctors.

HOW IT IS MADE.

When the case history of a new patient is returned to the registrar by the clinic chief, the registrar enters on the proper diagnosis card simply the number of the case.

WHAT IT IS GOOD FOR.

The diagnostic cross-index will enable the dispensary and its clinic chiefs to answer any of these questions in a very short space of time, by reference to the card bearing the name of the disease in question. The case histories are thus made immediately accessible and the work of

any clinic or the phenomena of any disease may be reviewed as frequently as desired. The large central file will prove a valuable, frequently-consulted source of available information, instead of a cemetery for case histories.

This very simple and inexpensive bit of medical bookkeeping will give an accurate gauge of the entire dispensary work and the results obtained. It makes the case histories far more readily accessible to the clinic chiefs than if filed in the clinics. It places in the doctor's hands at a few moments' notice his case histories of any disease.



THREE HUNDRED MILLION RED CROSS SEALS TO BE DISTRIBUTED.

Three hundred million Red Cross Christmas Seals are being printed in Cincinnati for the annual holiday campaign to be conducted under the joint auspices of the American Red Cross and The National Association for the Study and Prevention of Tuberculosis.

The campaign for the sale of Red Cross Seals this year will be larger than ever before. Although in 1915 the sale reached the record total of 80,000,000 seals, bringing in \$890,000, it is expected that this year at least 100,000,000 seals or \$1,000,000 worth will be sold. The sale will be organized from Alaska to the Canal Zone and from Hawaii to Porto Rico. Every state and territory in the United States will have seals on sale. New organizations will be working in a

number of the western states, including Montana, Utah and Wyoming. Distribution of the seals is now under way.

The Red Cross Christmas Seal for 1916 was designed by Mr. T. M. Cleland of New York City. It shows a Santa Claus in red on a green background in the center panel with a pack on his back bearing a red cross. The lettering "A Merry Christmas" and "A Happy New Year" is carried vertically up and down the sides of the seal, while the date and the words "American Red Cross" are across the bottom of the seal. The poster effect given by this seal is very striking and makes an unusually handsome design.

INDUSTRIAL HYGIENE AND HEALTH INSURANCE.

JOHN B. ANDREWS,

Secretary American Association for Labor Legislation.

IT IS sometimes said that the progress of industry was greater in the first half of the nineteenth century than in all the preceding ages. But in the glory of this striking achievement the worker's physical well-being received but little attention. Foul air, dust, filth, inadequate lighting, excessive hours, the unceasing roar of the machines, and finally speed, were some of the conditions now recognized as injurious.

The bad effects of such unhygienic working conditions have been pretty well understood for a long time. The French government issued a decree relating to "établissements dangereux, insalubres et incommodes" as early as 1810; the British Parliament provided a commission to study conditions in factories in 1815. German inquiries followed, and in the United States such official investigations have extended over more than three quarters of a century.

The first fifty years of investigation led to few definite results. Then there came a period of humanitarianism born of the dismal, degrading hopelessness of the workers. Out of this period came the first consequential efforts to improve factory sanitation through protective legislation. England had gradually built up a system of protective measures before France, in 1874, developed a labor code. In the United States the first law regarding

safety and hygiene in factories was enacted in Massachusetts in 1877.

During the period of a generation which has elapsed since the passage of that first American law in Massachusetts most of the states in this country have enacted laws aiming directly at the wage-earner's health. In sixteen states within five years we have required that physicians report certain occupational diseases. These reports have served a useful purpose in calling attention to a few of the most easily recognized trade maladies such as poisoning from phosphorus and lead. But the most earnest advocates of occupational disease reporting know that not even the one-thousandth part of industrial diseases will be notified under that legislation alone.

In a score of states we have laws requiring the removal of harmful dusts and fumes. These laws, too, have done some good. But people of understanding know that such regulations are frequently disregarded. We have, moreover, in the labor departments of half-a-dozen states some medical inspection of factories. Under a properly organized system for the conservation of health these inspectors should be occupying positions of dignity and power.

It must be admitted that despite a large body of regulatory legislation, which has had a very great educational value during a preparatory period,

existing laws have not been successful to any extensive degree in promoting industrial hygiene. Nothing is more educational than legislation; but the well informed know that legislation and education to promote industrial hygiene have thus far failed to produce adequate results in this country because one essential element has been lacking. They have lacked the element of constant financial pressure upon the employer, which is the most effective factor in winning the coöperation of employers in health conservation.

"What the state needs in the forward movement of organized society," says Professor Commons, "is the coöperation of all kinds of specialists with all kinds of interests affected. What is needed is such an organization of the departments of government as will bring this about. Each profession of experts contributes its essential part, but each is only a part and is ineffective without the other parts.

. . . The physician starts from the field of individual pathology; the sanitary engineer from that of physical surroundings, the sociologist from that of social environment. Each may be expert in his own field, but dogmatic, misleading or futile, when he ventures to dominate the others. Instead of giving orders, each should modestly coöperate; and it is the business of political science, of government and administration to work out the methods and machinery by which each shall do so."

Germany was the first country to work out the methods and machinery for the successful promotion of in-

dustrial hygiene. As early as 1883, after years of unsuccessful attempts through factory regulations and sporadic private initiative, Germany took the lead and enacted the first compulsory health insurance law.

This law gave rise to a system which is famous the world over and which is often referred to by friends and enemies of Germany alike as one of the main causes of Germany's remarkable industrial advance. In more recent years eight other countries have followed that early example.*

The German law makes insurance compulsory for all wage-earners and for those salaried workers whose annual income is not over \$600. The worker pays a part of the premium, and the employer a part; in other countries the state also contributes a share. The amount of the premium varies from $1\frac{1}{2}$ per cent. to $4\frac{1}{2}$ per cent. of the wages. The minimum cash benefit is 50 per cent. of the wages for each lost working day, and is supplemented by medical aid, the generosity and thorough organization of which have won fame for the German system. There the patient is entitled not only to medical treatment and medicines, but also to such medical supplies as spectacles, trusses and artificial limbs. The physician is frequently allowed to prescribe at the fund's expense special articles of food when they are necessary to the patient. Furthermore the enormous insurance funds are used for the construction of hospitals, sanatoria, health resorts, and

*These countries, arranged in chronological order of their laws are: Austria-Hungary, Luxemburg, Norway, Servia, England, Roumania, Russia and Holland.

special rest homes especially intended for the prevention of permanent incapacity. Maintenance there is provided for those persons who have drawn all their sick benefit but are still unable to work. There are also information bureaus, home visiting, in some places inspection of houses for the purpose of detecting unsanitary conditions, as well as lectures on all phases of hygiene. Elaborate statistics facilitating the study of the problem are kept by the imperial insurance office. And, by the way, we cannot too often repeat that no country has ever yet had sickness statistics worthy of the name until it had health insurance.

"German insurance legislation," says Dr. Lee K. Frankel of the Metropolitan Life Insurance Company, "has been effective in producing a comprehensive industrial hygiene. . . . Our need in the United States is the cultivation of the principle of prevention as applied to sickness and invalidity, similar to the beginnings which have been made in insurance against fire and accident. Before this can be done, however, we must have a comprehensive scheme of insurance against the consequences of sickness and invalidity."*

We need not, however, go to foreign sources for practical illustrations of the results which can be secured through social insurance. During the past five years a revolution has swept over this country and now two-thirds of our fifty states and territories have developed a form of social insurance popularly known as workmen's compensation for industrial accidents.

This revolution in the methods of dealing with the industrial accident problem was brought about by a campaign of education—growing out of efforts to secure *legislation*. The success of this revolutionary campaign in this country as elsewhere was based upon the realization that under the old system accidents were not being prevented and that the injured and their dependents were being thrust into poverty. Degradation and crime, the natural heirs of poverty, formed a social problem for which there was finally demanded a social remedy in the form of social insurance.

Notwithstanding some early defects, the ultimate success of the social insurance remedy in dealing with the *accident* problem is no longer questioned. It is only a matter of time when every state in the union will have adopted this method.

Previous to this workmen's compensation movement there were accident reporting laws, but our accident statistics as a whole were then aptly characterized as not worth the paper they were printed upon. Numerous states also had encouraged efforts for the safeguarding of dangerous machinery, but one public official qualified by practical experience now declares that more progress in accident prevention has been made in his state in one year under workmen's compensation than in any previous period of five years. This increased activity is due to the financial pressure upon employers to reduce their insurance premiums by installing safety devices which will improve their rating as insurance risks. Moreover, the same

*Industrial Insurance the Basis of Industrial Hygiene, 1912.

official declares that in his state ten times as many dollars are now automatically without litigation paid to the injured or their dependents, thus keeping them from falling below the poverty line. In a word, by the use of this insurance method, accidents are now reported *automatically*, and dangerous machinery is now being *safeguarded in earnest*, because those injured by accident are now being *compensated* for their disabilities. The insurance method, when rightly applied, furnishes a continuous economic pressure toward accident *prevention*. And prevention is the real problem.

The present situation with reference to *disease* is even worse than was the case with regard to accidents five years ago. Concerning health in the industrial world as a whole, the charge may justly be made, with but few qualifications, that the worker is still uninstructed of his danger, the employer is still ignorant or indifferent concerning preventive measures, and toward both conditions the public has been, until recently at least, profoundly apathetic. It is more difficult to dramatize the gradual lowering of vitality of half a million men than the accidental snuffing out of the lives of half a hundred.

The health of hundreds of thousands of working men and women is undermined today by conditions of employment which can be improved. British figures show that ill health is so general among the industrial population that 26 per cent. of the insured persons claimed sickness benefit during the first year's operation of the insurance act. Fully one-fourth of the sickness among

industrial workers can be prevented. Conservative experts have estimated that the mere financial saving due to such prevention each year might easily total one-quarter of a billion dollars. The moral, intellectual and social possibilities of this reform are of course beyond computation.

That problem, however, can not be met by scattered individual efforts. It is a problem for organization on a scale as vast and far-reaching as industry itself. It calls for the coöperation of all groups in the community. It requires the daily exercised precautions of informed workers in factory, workshop and mine; it requires the constant alertness of employers; it requires the best energy and skill of a devoted medical profession; it requires, finally, the constant compelling force of the government in order that administration may be comprehensive, secure and effective.

What motive can we appeal to and what method can we use in a comprehensive movement toward industrial hygiene?

Would it not be interesting to try what health insurance can do toward securing systematic reports of illness, scientific prevention of ill health, and reasonable care of those suffering from sickness? In this way alone can we hope to command the necessary funds for scientific treatment or to secure that unceasing pressure for prevention.

A sentiment favorable to such preparedness already manifests itself in many quarters. The American Federation of Labor at its last two conventions has discussed this subject. The Ohio State Board of Health, after

a two years' survey of industrial hygiene, recently published an editorial favoring state insurance against sickness. The American Medical Association has just published a fifty-page report on social insurance. The chairman of an important committee of the conservative National Association of Manufacturers reported in this language last summer after a wide study of the subject:

"I give it as my opinion that sickness insurance of some kind, with compulsory contribution on the part of employers, will be enacted into law by many states of the Union within the next five years and that now is the time to go into this subject thoroughly."

Shall we not all agree that the time is fully ripe for persistent scientific application to this problem? Surely we must admit that a thorough campaign of education is needed. Experience with the accident problem has demonstrated that social insurance is the most effective educator. Is it not time for us to apply the method of

social insurance, already revolutionary in its effects upon the problem of safety, to the solution of this greater question of health?

The problem of developing a compulsory health insurance system in America is of course a complicated one. The coöperation of many skilled and experienced people is needed. Legislative proposals ought to be carefully formulated and widely discussed. It was with this point of view that the Social Insurance Committee of the American Association for Labor Legislation began its work nearly three years ago. Over a year ago it formulated and widely distributed its tentative standards. As a result of much additional patient work and a continuing series of conferences, that committee is now ready to submit for wider discussion and criticism the draft of a health insurance bill. Doubtless many helpful suggestions will come from all interested groups, and it is expected that health insurance bills will soon be introduced in the legislatures of the principal industrial states.

THE REGISTRATION OF NON-RESIDENT DEATHS.

WM. H. DAVIS, M. D.,

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Read before the Vital Statistics Section of the American Public Health Association, Rochester, N. Y.,
September 9, 1915.

WHILE comparisons of the crude death-rates of different cities may be suggestive and so not devoid of all value, it is evident that refined or corrected death-rates permit much more accurate comparisons. Indeed the more the rates are corrected the more accurate become such comparisons.

Already the Census Bureau has published rates corrected for sex and age distribution, but if cities of the North and South are to be compared it is essential that the rates be corrected also for color.

Similarly for cities of the East and West, compared death-rates should be corrected for nationality, inasmuch as some nationalities are much more hardy than others; while to secure truly refined rates still further corrections for differences in occupations, in social conditions, etc., should be applied.

In a word, before the differences in our death-rates can be properly ascribed to differences in the climate and to differences in effectiveness of board of health work, like populations with like occupations must be given to the various cities to be compared.

While this extreme refinement of death-rates is hardly possible at present, there is no reason why some refinement cannot be attempted now,

so that our death-rates may more nearly indicate the effectiveness of health work.

To that end, therefore, I wish to urge a uniform method of dealing with deaths of non-residents.

The need of a correction for such deaths is evident from the fact that the commuters of some cities dwell within the city limits while in others they dwell outside such limits.

This fact is shown by comparing the populations of our large cities with the populations of their respective metropolitan districts.

These population figures for Boston show that 56 per cent. of the residents of the metropolitan district dwell outside the city proper, against 49 per cent. for Pittsburg and at the other extreme 1 per cent and 2 per cent. respectively for Seattle and Indianapolis.

It is self-evident that the cities with the more populous suburbs will have daily a greater influx of non-residents to shop, to work, to seek hospital treatment and to die.

While these figures are very striking, they do not tell the whole story, for a place with a comparatively small suburban population may still be a hospital center for a large territory and so have many non-resident deaths.

Although the need of correcting

TABLE A.

ADAPTED FROM TABLE 25 ABSTRACT OF THE 1910 CENSUS.

Population of metropolitan districts. Cities of 200,000 or over,			Percentage of metro- politan population out- side of the city proper.
New York	Metropolitan district.....	6,474,568	26
	In city proper.....	4,766,883	
	Outside.....	1,707,685	
Chicago	Metropolitan district.....	2,446,921	11
	In city proper.....	2,185,283	
	Outside.....	261,638	
Philadelphia	Metropolitan district.....	1,972,342	21
	In city proper.....	1,549,008	
	Outside.....	423,334	
Boston	Metropolitan district.....	1,520,470	56
	In city proper.....	670,585	
	Outside.....	849,885	
Pittsburg	Metropolitan district.....	1,042,855	49
	In city proper.....	533,905	
	Outside.....	508,950	
St. Louis	Metropolitan district.....	828,733	17
	In city proper.....	687,029	
	Outside.....	141,704	
San Francisco	Metropolitan district.....	686,873	39
	In city proper.....	416,912	
	Outside.....	269,961	
Baltimore	Metropolitan district.....	658,715	15
	In city proper.....	558,485	
	Outside.....	100,230	
Cleveland	Metropolitan district.....	613,270	9
	In city proper.....	560,663	
	Outside.....	52,607	
Cincinnati	Metropolitan district.....	563,804	36
	In city proper.....	363,591	
	Outside.....	200,213	
Minneapolis	Metropolitan district.....	526,256	43
	In city proper.....	301,408	
	Outside.....	224,848	
Detroit	Metropolitan district.....	500,982	7
	In city proper.....	465,766	
	Outside.....	35,216	
Buffalo	Metropolitan district.....	488,661	13
	In city proper.....	423,715	
	Outside.....	64,946	

TABLE A—*Concluded.*

Population of metropolitan districts. Cities of 200,000 or over.			Percentage of metropolitan population outside of the city proper,
Los Angeles	Metropolitan district	438,226	27
	In city proper	319,198	
	Outside	119,028	
Milwaukee	Metropolitan district	427,175	12
	In city proper	373,857	
	Outside	53,318	
Providence	Metropolitan district	395,972	43
	In city proper	224,326	
	Outside	171,646	
Washington	Metropolitan district	367,869	10
	In city proper	331,069	
	Outside	36,800	
New Orleans	Metropolitan district	348,109	3
	In city proper	339,075	
	Outside	9,034	
Kansas City, Mo.	Metropolitan district	340,446	27
	In city proper	248,381	
	Outside	92,065	
Louisville	Metropolitan district	286,158	22
	In city proper	223,928	
	Outside	62,230	
Rochester	Metropolitan district	248,512	12
	In city proper	218,149	
	Outside	30,363	
Seattle	Metropolitan district	239,269	1
	In city proper	237,194	
	Outside	2,075	
Indianapolis	Metropolitan district	237,783	2
	In city proper	233,650	
	Outside	4,133	
Denver	Metropolitan district	219,314	3
	In city proper	213,381	
	Outside	5,933	
Portland Ore.	Metropolitan district	215,048	4
	In city proper	207,214	
	Outside	7,834	

crude death-rates for deaths of non-residents is generally recognized, opinions differ as to how this should be done.

Confusion has arisen in the dis-

cussion of this subject because "non-resident deaths" has not been clearly defined. It has sometimes been used as synonymous with "transferable deaths" an expression used in England,

though it is easy to see that in an endeavor to determine a refined death-rate other deaths beside non-resident deaths would be transferable.

Again opinions differ as to what deaths should be considered non-resident. Some include only deaths of non-residents in hospitals, some include also deaths of transients at the homes of friends, in hotels, etc., and some include those who have not dwelt in the city at least six months or a year.

On the other hand some favor excluding from non-resident deaths, non-residents who die as a result of accidents received within the city.

Still all will agree that for the purposes of comparison it is essential that the expression—deaths of non-residents—have a uniform meaning.

Now inasmuch as a death-rate simply expresses the number of the population who have died, the term non-resident should mean exactly the same whether applied to deaths or to population.

But we know what non-resident means when applied to the population, the meaning is clearly given in the instructions to the census enumerators, the principal guide to residence being the place of habitual abode.

Therefore when we speak of non-resident deaths we should use the word in exactly the same sense.

Instructions to census enumerators on this subject in 1910 were principally as follows:

“The law provides that all persons shall be enumerated at their ‘usual place of abode.’ This means the place where they may be said to live

or belong, or the place which is their home.

“As a rule the usual place of abode is the place where a person regularly sleeps.

“There will be a certain number of persons having their usual place of abode in your district who are absent at the time of the enumeration. Thus if a member of any family in your district is temporarily away from home on a visit, or on business, or traveling for pleasure, or attending school or college, or sick in a hospital, such absent person should be enumerated and included with the other members of the family. But a son or daughter permanently located elsewhere should not be included with the family.

“There will be, on the other hand, a certain number of persons present and perhaps lodging and sleeping in your district at the time of the enumeration who do not have their usual place of abode there. As a rule, therefore, you should not enumerate or include with the members of the family you are enumerating any of the following classes:

“Persons visiting with this family;

“Transient boarders or lodgers who have some other usual or permanent place of abode;

“Students or children living or boarding with this family in order to attend some school, college, or other educational institution in the locality, but not regarding the place as their home;

“Persons who take their meals with this family, but lodge or sleep elsewhere;

“Servants, apprentices, or other

persons employed by this family and working in the house or on the premises, but not sleeping there; or

"Any person who was formerly in this family, but has since become an inmate of an asylum, almshouse, home for the aged, reformatory, prison, or any other institution in which the inmates may remain for long periods of time.

"Servants, laborers, or other employees who live with the family and sleep in the same house or on the premises should be enumerated with the family.

"Boarders (that is, persons eating and sleeping at the same place) or lodgers should be enumerated at the place where they are rooming or lodging, if they are there permanently or for reasons of a permanent nature—for instance, if this is their usual place of abode while carrying on their regular occupation or business.

"But transient boarders or lodgers who have no permanent home or usual place of abode should be enumerated where they happen to be stopping at the time of the census. This applies in particular to the lodgers in cheap one-night lodging houses who, for the most part, represent a floating population, having no permanent homes.

"If there is a school, college, or other educational institution in your district which has students from outside your district you should enumerate only those students who have their homes or regular places of abode in your district.

"Most inmates of medical and surgical hospitals are there only for temporary treatment and have other

regular places of abode. Therefore you should not report as a resident of the hospital any patient unless he claims to have no other usual place of abode from which he is likely to be reported.

"If there is within your district a prison, reformatory, or jail, an almshouse, an asylum or home (sometimes called hospital) for the insane, orphans, blind, deaf, incurable, or feeble-minded, a soldiers' home, a home for the aged, or any similar institution in which inmates usually remain for long periods of time, all the inmates of such an institution should be enumerated as of your district. It is to be specially noted that in the case of jails the prisoners should be there enumerated however short the term of sentence."

So that in any doubtful case the residence should be decided by the rules laid down for the census enumerators. A correction for non-resident deaths will then be a perfectly definite correction easy to understand, easy to apply and a big step forward—though it will not be a panacea for all the imperfections which enter into a crude death-rate, any more than is the correction for sex and age distribution.

Therefore as a simple solution to this vexing question the suggestion is made that all reports give, first, total deaths, second, deaths of residents (*i. e.*, non-residents deducted), and whenever possible a third number of deaths, *i. e.*, the corrected number of deaths after all transferable deaths have been transferred. Corresponding rates for each of these totals could then be given.

For example the following headings and footnotes could be used:

Total deaths (stillbirths excluded);

*Deaths of residents;

†Corrected number of deaths;

Crude death-rate;

‡Death-rate of residents;

§Corrected death-rate.

In obtaining the corrected number of deaths, some places would be able to add in deaths of residents which occurred in certain institutions outside the city while others might be able to add in also many others who died outside.

Again in some health resorts it would be possible to transfer deaths of transients who had contracted the disease elsewhere, or where the length of residence was less than the duration of the preferred cause of death.

Persons dying in jails, lunatic asylums and workhouses might be transferred to the towns where they formerly resided, though in such cases the population should be correspondingly diminished in computing the refined death-rates.

Deaths of illegitimate infants in infant asylums might be transferred to the home towns of the mothers, if known, and the population correspondingly decreased.

Non-residents deaths when the disease was evidently contracted within the city might be transferred to the

city. However, if this is done it is only logical to transfer out of the city deaths of residents when the disease was contracted outside.

Deaths of non-residents from violence received within a city should also, according to some, be credited to the city, though I do not agree with this view. For going back to our large metropolitan districts with their great daily influx of non-residents, the greatly increased daily population will surely result in more accidents and more deaths than would occur without such an increase in the population. So that if these deaths from accidents to non-residents are to be charged up to the city in which they occur, then in some way the population should be increased by an estimate of the daily influx of non-residents. Such an estimate of increased population would certainly be difficult.

The simpler method, it seems to me, is to consider such deaths as we do other non-resident deaths.

Then the two totals side by side, total deaths from accident and deaths of residents from accident, will clearly show how many deaths of non-residents were due to accident.

Surely the mere citation of these various possible corrections for transferable deaths shows how complex the problem is; and inasmuch as it is not now practicable for all places to transfer all deaths in the same way, is it not best to leave this question of transferable deaths to be worked out as well as may be by each health officer, following so far as possible the admirable rules suggested in Doctor Wilbur's paper last year? If this plan

*Deaths of non-residents deducted from total deaths but deaths outside the city of residents not added.

†Corrected for transferable deaths, *i. e.*, deaths of non-residents deducted from total deaths, deaths of those who contracted the disease elsewhere deducted, deaths outside the city of residents added, etc. (stating definitely what deaths have been transferred).

‡Based upon deaths of residents within the city, no deaths outside the city of residents added.

§Based upon the corrected number of deaths, corrected for age and sex distribution, etc. (stating definitely all corrective factors applied).

is followed, I would emphasize the need of definitely stating in the footnotes just what deaths have been transferred whenever corrected figures are given.

Or perhaps it would be best at present for most cities to give only the crude figures, and the figures for residents, omitting entirely the column designated *corrected number of deaths*, leaving this more complex refinement to be worked out by state registrars and the Census Bureau.

To summarize briefly:

Non-resident deaths should be registered as such.

Alongside total deaths in reports should be given deaths of residents (*i. e.*, non-residents deducted) with corresponding rates.

The term non-resident should be used as in the enumeration of the census, and instructions to the enumerators should furnish the basis for determining the residence in each case.

Other transferable deaths may enter into a corrected total of deaths and a more refined death-rate, but should not befog the simpler question of deaths of non-residents.

WHAT YOU SHOULD KNOW ABOUT TUBERCULOSIS.

Free expert advice for consumptives and others interested in tuberculosis is given in a pamphlet just issued by the National Association for the Study and Prevention of Tuberculosis entitled "What You Should Know About Tuberculosis."

The pamphlet was prepared by a committee of experts of international prominence consisting of Dr. Charles L. Minor of Asheville; Dr. David R. Lyman of Wallingford, Conn.; Dr. H. R. M. Landis of Philadelphia; Dr. John H. Lowman of Cleveland, and William H. Baldwin of Washington. It contains the latest and most authoritative information about tuberculosis.

It deals with the nature of the disease; how infection may take place; how the disease is cured; how the family may be protected; what the patient may do after discharge, and how the disease may be prevented in the community.

A copy of the pamphlet will be sent free to anyone applying for it at the office of the Committee on the Prevention of Tuberculosis, State Charities Aid Association, 105 East 22d Street, New York, and large supplies of copies for local distribution may be had at cost from the Committee.

A CENSUS OF THE CONTAGIOUS DISEASES OF 8,786 CHILDREN.

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From data collected during the year 1912-1913 by H. W. Hill, M. B., M. D., D. P. H. Director.

THIS report on the contagious diseases of children (namely, chickenpox, diphtheria, German measles, measles, mumps, scarlet fever and whooping-cough), is a completion of a former partial report issued by the Institute of Public Health, London, Canada, and published in the AMERICAN JOURNAL OF PUBLIC HEALTH, September, 1913.

Primarily the aim of this census was to obtain more complete statistics of the above contagious diseases; secondarily, to test the method of collecting data here employed.

THE METHOD OF COLLECTING DATA.

Cards were distributed, throughout the schools of the city, to be filled in by the mother (or guardian) for each

TABLE 1.
SHOWING THE NUMBER OF CHILDREN, AT EACH AGE, FOR WHICH A CARD WAS CORRECTLY FILLED IN.

Age.	Male.	Female.	Total.	
Under 1	78	72	150	Total under 5 = 1,240
1	99	101	200	
2	124	117	241	
3	138	117	255	
4	196	198	394	
5	271	256	527	
6	354	318	672	
7	356	339	695	
8	350	371	721	
9	344	352	696	
10	341	327	668	Total (5-14) = 6,237
11	306	291	597	
12	307	307	614	
13	283	297	580	
14	237	240	477	
15	197	170	367	Total (15-20) = 1,309
16	139	170	309	
17	100	133	233	
18	80	90	170	
19	59	85	144	
20	31	45	76	
Total.....	4,390	4,396	8,786	

school child, and also for those children at home below or above school age. The facts required concerning each child were:

1. The sex of the child.
2. The age of the child at the time of census.
3. Which of the above diseases the child had had and at what ages the attacks occurred.

THE RETURNS.

The total number of cards returned was 8,993, of which 207 or 2.3 per cent. were rejected as improperly filled out leaving 8,786 satisfactory cards, representing children which were distributed by age and sex as in Table 1. (Of

the rejected cards 117 were used for certain purposes in the report of 1913. These were, however, rejected in this report because the age at the time of attack was not given although it was stated that the child had had the disease.)

The number of Public School children (ages 5-14) for which a correctly filled in card was returned was 88 per cent. of the total attendance.

Table 2 gives the percentage, for each disease, of the children at each age who had already had an attack. It might be noted that the age of the child *at the time of the attack* is not necessary in the calculation of the results of this table, but only whether

TABLE 2.
SHOWING THE PERCENTAGE OF THE CHILDREN, AT EACH AGE, WHO HAD
ALREADY SUFFERED AN ATTACK.

Age.	Chicken-pox.	Diphtheria.	German measles.	Measles.	Mumps.	Scarlet fever.	Whooping-cough.	Total.
Under 1	.7	.0	.0	.0	.0	.0	6.0	6.7
1	8.0	.0	.0	4.0	1.0	0	14.5	27.5
2	11.2	.8	1.2	10.4	4.8	.8	19.9	49.1
3	18.8	.8	3.1	22.0	5.1	3.9	25.9	82.6
4	22.1	1.5	2.0	33.7	11.1	5.1	38.6	112.1
5	27.3	1.7	4.4	35.5	9.4	5.3	42.7	128.3
6	32.6	2.1	6.3	49.7	17.3	5.9	55.7	169.6
7	40.4	2.4	4.7	60.3	23.0	11.5	58.0	200.3
8	39.8	3.1	8.4	71.2	27.7	12.2	59.6	222.0
9	46.0	5.7	9.9	79.5	38.1	10.0	60.8	250.0
10	49.2	6.4	9.3	79.3	39.8	15.4	65.3	264.7
11	49.9	7.7	12.9	80.4	50.9	18.2	63.2	283.2
12	50.8	10.9	12.7	82.9	50.9	21.7	64.0	293.9
13	51.9	11.6	15.2	85.0	57.1	23.6	64.7	309.1
14	57.0	11.7	15.3	82.6	49.7	26.0	60.6	302.9
15	52.3	13.9	13.1	84.2	52.5	26.7	60.0	302.7
16	53.1	14.7	17.2	82.2	54.4	28.5	61.8	311.9
17	55.8	13.3	15.0	83.3	53.2	26.2	62.2	309.0
18	51.2	17.6	12.9	81.8	45.9	24.7	54.7	288.8
19	58.3	16.7	20.1	84.0	60.4	30.6	63.2	333.3
20	47.4	17.0	17.0	82.1	51.3	28.9	51.3	295.0

or not the child had had the disease. Hence any error in misstating the age at which the attack was suffered would not influence these percentages.

In considering the results of Table 2 it may be well to remember that:

1. The number of cards returned for children at the extreme ages is comparatively small. This might cause the results at these ages to be slightly unreliable.

2. There probably was a tendency on the part of some mothers or guardians not to fill in a card at all unless the child had had one at least of the seven diseases. Any error thus introduced would be in the direction of increasing the percentage figures given in this table, over the truth. This tendency would be gradually eliminated in the case of older children, because of the fact that very few children at the older ages would be found who had not suffered from at least one of the seven infectious diseases dealt with.

3. In the case of older children there may have been a tendency to forget an attack, which would reduce the percentage figures given, below the truth.

It may, therefore, be that the results at the younger ages are indicated as larger than they should be; at the older ages, as smaller. (See also comments on Table 8.)

Table 3 (a) gives the number of females attacked by each disease, per 100 males attacked by the same disease for groups of children composed of 100 of each sex at each age from 6 to 14 inclusive.

Table 3 (a), showing the number of females who had already been attacked, per 100 males already attacked in a group of children consisting of 100 of each sex, at each age, from 6 to 14 inclusive:

In every case it is to be noticed that the female attack rate is larger than that of the male, the difference being comparatively small however.

Table 3 (b) gives the number of attacks, per head, already suffered from all seven infections, by the children of each school, each school being reduced to a standard namely:

A school, the attendance of which is composed of 100 children of each sex, at each age from 6 to 14 inclusive.

From this table it appears that the prevalence of the seven infectious diseases here treated is not affected to any great extent by the social conditions of the children.

Table 4 gives the percentage of certain groups of children attacked when at a certain age (*i. e.*, when in a certain year of life). The groups being composed of those children:

TABLE 3 (a).

SHOWING THE NUMBER OF FEMALES WHO HAD ALREADY BEEN ATTACKED, PER 100 MALES ALREADY ATTACKED IN A GROUP OF CHILDREN CONSISTING OF 100 OF EACH SEX, AT EACH AGE, FROM 6 TO 14 INCLUSIVE.

Chicken-pox.	Diphtheria.	German measles.	Measles.	Mumps.	Scarlet fever.	Whooping-cough.	All.
106	114	116	102	101	111	105	105

TABLE 3 (b).

SHOWING THE NUMBER OF ATTACKS
PER HEAD, FROM ALL SEVEN INFEC-
TIONS, FOR THE DIFFERENT SCHOOLS.

School.	Number of attacks per head.
Aberdeen	2.5
Alexandra	2.6
Chesley Avenue	2.5
Colborne Street	2.8
Empress Avenue	2.2
Grand Avenue	2.5
King Street	2.5
Lorne Avenue	2.7
Princess Avenue	2.6
Quebec Street	2.7
Rectory Street	2.5
Richmond Street	2.6
Simcoe Street	2.5
St. George's	2.6
Talbot Street	2.5
Victoria Street	2.7
Wortley Road	2.5
Sacred Heart	2.6
St. Mary's and St. Martin's	2.2
St. Michael's	2.7
St. Peter's	2.2

(a) Who at time of the census had passed the year of life under consideration.

(b) Whose ages *at time of census* were 16-20 years.

(c) Whose ages *at time of census* were 11-15 years.

(d) Whose ages *at time of census* were 6-10 years.

The number of children in each group being:

(a) From 8,636 to 932.

(b) 932.

(c) 2,635.

(d) 3,452.

This table brings out certain fallacies due to the method of collecting data.

1. Assuming that the seven diseases of the table are not increasing in prevalence it appears that in the case of older children an attack is sometimes forgotten. This is most evident in cases of the milder and more prevalent infections, especially if some time has passed since the attack occurred, as is plain from the results for chickenpox, measles, mumps, whooping-cough, and the total.

For instance, in measles we notice that the figures for the first and second three year periods in column D are much larger than in column C; also those in column C are in turn larger than those in column B.

2. The age at the time of attack, especially in cases of older children, may be misstated, being given as higher than it really was. This may be the reason for the fact that while in the case of chickenpox and whooping-cough, the percentage attack for the first and second three year periods of life is much larger in group C than in B, it is larger for the third three year period in B than in C. Yet this result may be due to the number of forgotten attacks for this period being comparatively few in the case of children of group (B).

It is also to be noticed in the case of diphtheria and scarlet fever that the figures in column D are much smaller than the corresponding figures in column C. This leads to the conclusion that these two diseases are decreasing in prevalence.

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TABLE 4.

SHOWING THE PERCENTAGE OF CERTAIN GROUPS OF CHILDREN WHO SUFFERED AN ATTACK, WHEN AT A CERTAIN AGE (*i. e.* WHEN IN A CERTAIN YEAR OF LIFE).

Age.	Chickenpox.				Diphtheria.				German measles.				Measles.			
	A.	B.	C.	D.	A.	B.	C.	D.	A.	B.	C.	D.	A.	B.	C.	D.
Under 1	.9	.2	.7	1.1	.1	.1		.1	.2		.2	.1	1.4	.6	1.4	1.6
1	3.1	2.5	2.6	2.9	.4	.5	.3	.4	.6	.2	.8	.7	5.4	3.6	4.6	5.9
2	4.8	4.0	4.6	4.3	.6	.4	.8	.5	.7	.8	.8	.6	7.9	3.8	6.9	9.0
3	5.1	4.0	5.2	5.4	.8	1.0	1.4	.5	1.1	1.0	1.4	1.0	8.9	5.5	8.1	9.5
4	6.5	5.0	6.3	6.7	1.0	1.6	1.4	.8	1.2	1.6	1.2	1.1	9.8	7.3	8.4	11.5
5	6.6	5.7	6.9	6.6	1.1	1.6	1.7	.4	1.2	1.7	1.1	1.2	10.9	11.1	11.1	10.7
6	7.0	6.5	6.5		1.1	1.0	1.6		1.5	1.9	1.4		11.1	11.7	11.3	
7	5.7	5.8	5.2		1.9	1.5	1.0		1.4	1.4	1.2		9.5	7.6	9.3	
8	4.8	4.8	4.4		.6	1.1	.5		1.3	.8	1.6		8.1	8.0	8.2	
9	3.3	3.6	3.1		1.0	2.3	.7		1.2	1.2	1.2		5.3	4.3	5.9	
10	3.1	3.2	3.0		.8	1.1	.7		1.1	1.1	1.1		4.6	6.4	3.9	
11	1.9	1.7			.5	1.2			.9	.9			2.8	3.2		
12	2.2	2.6			.5	.5			1.2	1.3			2.5	3.2		
13	1.4	1.6			.2	.3			.5	.3			1.6	2.0		
14	1.2	1.2			.5	.5			1.1	1.2			1.3	1.5		
15	.4	.4			.1	.1			.4	.4			1.8	1.8		
i	8.8	6.7	7.9	8.3	1.1	1.0	1.1	1.0	1.5	1.0	1.8	1.4	14.7	8.2	12.9	16.5
ii	18.2	14.7	18.4	18.7	2.9	4.2	4.5	1.7	3.5	4.3	3.7	3.3	29.6	23.9	27.6	31.7
iii	17.5	17.1	16.1		2.6	3.6	3.1		4.2	4.1	4.2		28.7	27.3	28.8	
iv	8.3	8.5			2.3	4.6			3.2	3.2			12.7	13.9		
v	4.8	5.4			1.2	1.3			2.8	2.8			5.4	6.7		

	Mumps.				Scarlet fever.				Whooping-cough.				All diseases.			
1	.1	.1			.2		.4	.2	2.3	1.6	2.0	2.3	5.3	2.7	4.7	5.5
2	.8	.3	.4	.9	.8	.9	1.3	.5	6.2	4.4	5.4	6.7	17.3	12.5	15.4	18.1
3	1.9	1.8	1.2	2.1	1.4	1.0	2.2	.9	8.0	4.7	7.0	8.4	25.2	16.4	23.5	25.7
4	2.6	1.9	1.5	3.5	1.9	1.5	2.4	1.3	8.3	6.1	8.1	9.4	28.7	20.9	28.1	30.6
5	3.8	2.6	2.8	4.8	2.2	3.1	3.1	1.5	8.7	6.7	9.2	9.5	33.1	27.9	32.3	36.0
6	5.2	4.2	5.1	5.4	2.6	2.9	3.0	2.2	8.3	7.4	8.1	8.7	35.8	34.6	37.1	35.3
7	5.7	4.4	6.9		1.9	2.9	1.7		6.9	7.5	6.6		35.1	35.9	36.0	
8	6.1	4.3	7.8		2.3	3.4	1.9		5.5	4.4	5.4		31.4	28.4	31.8	
9	6.5	4.0	7.1		2.1	2.6	1.8		3.8	4.7	3.9		27.2	26.0	26.6	
10	5.5	2.5	6.4		1.9	2.7	1.7		2.7	2.8	2.9		20.9	19.3	21.8	
11	5.5	4.0	6.1		1.5	2.3	1.3		2.4	3.8	1.9		19.0	21.8	18.0	
12	3.5	4.9			1.0	1.0			1.2	1.9			11.9	14.8		
13	4.6	5.4			1.1	.8			1.2	2.2			13.4	16.0		
14	3.2	3.3			.7	.5			.6	.8			8.1	8.9		
15	3.2	3.4			1.1	1.2			.2	.2			8.5	9.2		
16	2.6	2.6			.6	.6			.3	.3			6.2	6.2		
i	2.8	2.2	1.6	3.0	2.4	1.9	3.9	1.6	16.5	10.7	14.4	17.4	47.8	31.6	43.6	49.3
ii	11.6	8.7	9.4	13.7	6.7	7.5	8.5	5.0	25.3	20.2	25.4	27.6	97.6	83.4	97.5	101.0
iii	18.3	12.7	21.8		6.3	8.9	5.4		16.2	16.6	15.9		93.7	90.3	95.4	
iv	14.5	11.4			4.4	6.0			6.3	8.5			51.8	55.9		
v	11.0	12.1			2.9	2.5			2.0	3.2			30.0	34.1		

i, under 3; ii, 3 to 5; iii, 6 to 8; iv, 10 to 12; v, 13 to 15.

Table 5 gives the percentage of the children already attacked on reaching a certain age (*i. e.*, on reaching a certain birthday). The results here given are obtained simply by a successive summation of the results of Table 4.

As already noted the figures of Table 4 do not represent the true percentage of the children attacked when

at a certain age. This is due to facts already mentioned in connection with that table.

Table 6 is therefore given. It is identical in form with Table 4 differing only in the figures of the different columns. The percentage of the children attacked when at a certain age, in this table, is believed to be more

TABLE 5.

SHOWING THE PERCENTAGE OF CERTAIN GROUPS OF CHILDREN WHO HAD ALREADY SUFFERED AN ATTACK, ON REACHING A CERTAIN AGE (*i. e.*, ON REACHING A CERTAIN BIRTHDAY).

Age	Chickenpox.				Diphtheria.				German measles.				Measles.			
	A.	B.	C.	D.	A.	B.	C.	D.	A.	B.	C.	D.	A.	B.	C.	D.
1	.9	.2	.7	1.0	.1	.1	.0	.1	.2	.0	.2	.1	1.4	.6	1.4	1.6
2	4.1	2.8	3.3	4.0	.5	.6	.3	.5	.8	.2	1.0	.8	6.8	4.3	6.0	7.6
3	8.9	6.7	7.9	8.3	1.1	1.1	1.2	1.0	1.6	1.0	1.8	1.4	14.6	8.0	12.9	16.6
4	14.0	10.6	13.2	13.7	1.9	2.0	2.6	1.5	2.7	1.9	3.2	2.4	23.5	13.5	21.0	26.1
5	20.5	15.7	19.4	20.4	3.0	3.7	4.0	2.2	3.9	3.5	4.3	3.5	33.2	20.8	29.3	37.6
6	27.1	21.3	26.3	27.0	4.0	5.3	5.8	2.6	5.1	5.3	5.5	4.8	44.1	31.9	40.4	48.3
7	34.1	28.0	32.8		5.1	6.2	7.3		6.6	7.2	6.9		55.2	43.6	51.8	
8	40.0	33.7	38.0		6.0	7.7	8.3		7.9	8.6	8.1		64.7	51.2	61.1	
9	44.6	38.5	42.4		6.7	8.8	8.8		9.3	9.4	9.7		72.8	59.2	69.3	
10	47.9	42.2	45.5		7.7	11.1	9.5		10.4	10.5	10.9		78.1	63.5	75.1	
1	51.0	45.4	48.5		8.5	12.1	10.2		11.5	11.6	12.0		82.7	70.0	79.0	
2	52.9	47.2			9.0				12.5	12.5			85.5	73.2		
3	55.0	49.7			9.6				13.7	13.8			87.9	76.4		
4	56.4	51.3			9.8				14.1	14.1			89.6	78.4		
5	57.5	52.5			10.2				15.2	15.2			90.9	80.0		
6	58.0	52.9			10.4				15.7	15.7			92.7	81.8		
Age	Mumps.				Scarlet fever				Whooping-cough.				All.			
	A.	B.	C.	D.	A.	B.	C.	D.	A.	B.	C.	D.	A.	B.	C.	D.
1	.1	.1	.0	.0	.2	.0	.4	.2	2.3	1.6	2.0	2.3	5.3	2.7	4.7	5.5
2	.9	.4	.5	.9	1.0	.9	1.7	.7	8.5	6.0	7.4	9.0	22.6	15.1	20.2	23.5
3	2.8	2.2	1.7	3.0	2.4	1.8	3.9	1.7	16.5	10.7	14.3	17.4	47.8	31.6	43.7	49.2
4	5.4	4.2	3.2	6.5	4.3	3.3	6.3	2.9	24.8	16.9	22.4	26.8	76.5	52.4	71.8	79.8
5	9.2	6.8	6.1	11.3	6.5	6.5	9.3	4.4	33.4	23.5	31.6	36.3	109.6	80.4	104.1	115.8
6	14.3	11.0	11.2	16.8	9.1	9.4	12.4	6.6	41.7	30.9	39.7	45.0	145.4	114.9	141.2	151.0
7	20.0	15.4	18.0		11.0	12.3	14.1		48.6	38.4	46.3		180.5	150.9	177.3	
8	26.1	19.6	25.9		13.3	15.7	16.0		54.1	42.8	51.8		212.0	179.3	209.0	
9	32.6	23.6	33.0		15.4	18.3	17.8		57.8	47.6	55.7		239.8	205.3	236.6	
10	38.1	26.1	39.3		17.3	20.9	19.4		60.5	50.4	58.6		260.0	224.6	258.5	
1	43.6	30.1	45.4		18.8	23.2	20.7		62.9	54.1	60.5		279.0	246.3	276.5	
2	47.2	35.0			19.8	24.2			64.1	56.1			291.0	261.1		
3	51.8	40.4			21.0	24.9			65.4	58.3			304.3	277.1		
4	54.9	43.7			21.7	25.4			66.0	59.1			312.4	286.1		
5	58.1	47.1			22.8	26.6			66.1	59.3			320.9	295.3		
6	60.7	49.7			23.3	27.2			66.4	59.6			327.1	301.5		

TABLE 6.

SHOWING THE ESTIMATED PERCENTAGE OF CHILDREN WHO SUFFERED AN ATTACK WHEN AT A CERTAIN AGE (*i. e.* WHEN IN A CERTAIN YEAR OF LIFE).

Age.	Chicken-pox.	Diphtheria.	German measles.	Measles.	Mumps.	Scarlet fever.	Whooping-cough.	Total.
Under 1	1.1	.1	.2	1.6	.1	.2	2.2	5.5
1	2.9	.4	.6	5.8	.8	.9	6.2	17.6
2	4.3	.6	.7	8.0	2.1	1.4	8.0	25.1
3	5.4	.9	1.1	9.6	3.4	2.0	9.0	31.4
4	6.2	1.1	1.2	10.6	4.5	2.5	9.5	35.6
5	6.7	1.2	1.3	11.0	5.4	2.5	8.7	36.8
6	6.7	1.2	1.5	11.2	6.2	2.5	7.0	36.3
7	5.5	1.2	1.4	9.3	7.0	2.5	5.4	32.3
8	4.5	1.1	1.2	7.6	7.1	2.3	4.0	27.8
9	3.6	1.0	1.1	5.9	6.4	2.0	2.8	22.8
10	2.9	.9	1.0	4.3	5.5	1.7	2.0	18.3
11	2.3	.8	.9	3.1	4.8	1.4	1.4	14.7
12	1.8	.7	.8	2.4	4.0	1.1	1.0	11.8
13	1.3	.6	.7	1.8	3.3	.9	.6	9.1
14	.9	.5	.6	1.3	2.9	.7	.4	7.2
15	.5	.4	.5	1.0	2.6	.6	.2	5.7

representative of the truth, because the figures of Table 4 for the younger age groups (*i. e.*, the most reliable figures) were selected as far as possible. These were then graded so as to increase to a maximum, and then to decrease, as the age (*i. e.*, the year of life) increases.

With the exception of diphtheria and scarlet fever, for which diseases there is evidence of a decrease in prevalence (See Table 4), the figures of this table should represent present conditions. (See Table 9.)

Table 7 is obtained simply by a successive summation of the figures of Table 6. It gives the percentage of the children already attacked on reaching a certain age (*i. e.*, a certain birthday).

This table is identical with Table 5 except that the percentages should be more representative of the truth.

Table 8 gives the percentage of the children of a certain age who have already suffered an attack, deduced from Table 7 as follows:

The children of a certain age (say 5) have lived $5\frac{1}{2}$ years on the average. Therefore the percentage of these who have already suffered an attack would be the mean value for those who have lived exactly 5 and 6 years respectively, as given in Table 7.

This table is identical with Table 2 except that the values should be more representative of the truth, because of the fact that the results of this table were obtained by considering the cases of:

TABLE 7.

SHOWING THE ESTIMATED PERCENTAGE OF CHILDREN WHO HAVE ALREADY SUFFERED AN ATTACK ON REACHING A CERTAIN AGE (*i. e.* ON REACHING A CERTAIN BIRTHDAY).

Age.	Chicken-pox.	Diphtheria.	German measles.	Measles.	Mumps.	Scarlet fever.	Whooping-cough.	Total.
1	1.1	.1	.2	1.6	.1	.2	2.2	5.5
2	4.0	.5	.8	7.4	.9	1.1	8.4	23.1
3	8.3	1.1	1.5	15.4	3.0	2.5	16.4	48.2
4	13.7	2.0	2.6	25.0	6.4	4.5	25.4	79.6
5	19.9	3.1	3.8	35.6	10.9	7.0	34.9	115.2
6	26.6	4.3	5.1	46.6	16.3	9.5	43.6	152.0
7	33.3	5.5	6.6	57.8	22.5	12.0	50.6	188.3
8	38.8	6.7	8.0	67.1	29.5	14.5	56.0	220.6
9	43.3	7.8	9.2	74.7	36.6	16.8	60.0	248.4
10	46.9	8.8	10.3	80.6	43.0	18.8	62.8	271.2
11	49.8	9.7	11.3	84.9	48.5	20.5	64.8	289.5
12	52.1	10.5	12.2	88.0	53.3	21.9	66.2	304.2
13	53.9	11.2	13.0	90.4	57.3	23.0	67.2	316.0
14	55.2	11.8	13.7	92.2	60.6	23.9	67.8	325.1
15	56.1	12.3	14.3	93.5	63.5	24.6	68.2	332.3
16	56.6	12.7	14.8	94.5	66.1	25.2	68.4	338.0

(a) Children over 5 years of age, thus tending to eliminate the effects due to the tendency, previously noted, to fill in cards only in case of the child having at least one of the infections (*i. e.*, the effect increasing the percentages at the younger ages over the truth).

(b) The youngest possible group of children, above 5 years, tending to eliminate the effect due to the tendency of an attack being forgotten when some time has elapsed (*i. e.*, the effect decreasing the percentages at the older ages below the truth).

Comparing the results of this table with those of Table 2 it might be noted, especially in the percentage attack from all seven infections, that:

(a) At the *younger ages* the figures

are *smaller* than the corresponding ones of Table 2.

(b) At the *older ages* the figures are *larger* than the corresponding ones of Table 2.

This is as might be expected in view of the comments on Table 2. In other words we have proof of the two fallacies of the method of collecting data in this census.

(a) In case of the *younger* children cards were often not returned for children who had not had an attack from any of the infections.

(b) In case of the *older* children an attack of one or more of the infections was sometimes forgotten.

Table 9 gives the estimated annual number of cases occurring in the children under 16 years, for five consecu-

TABLE 8.

SHOWING THE ESTIMATED PERCENTAGE OF CHILDREN OF A CERTAIN AGE,
WHO HAVE ALREADY SUFFERED AN ATTACK.

Age.	Chicken pox.	Diph- theria.	German measles.	Measles.	Mumps.	Scarlet fever.	Whooping- cough.	Total.
Under 1	.6	.1	.1	.8	.1	.1	1.1	2.9
1- 2	2.6	.3	.5	4.5	.5	.7	5.3	14.4
2- 3	6.2	.8	1.2	11.4	2.0	1.8	12.4	35.8
3- 4	11.0	1.6	2.1	20.2	4.7	3.5	20.9	64.0
4- 5	16.8	2.6	3.2	30.3	8.7	5.8	30.2	97.6
5- 6	23.3	3.7	4.5	41.1	13.6	8.3	39.3	133.8
6- 7	30.0	4.9	5.9	52.2	19.4	10.8	47.1	170.3
7- 8	36.1	6.1	7.3	62.5	26.0	13.3	53.3	204.6
8- 9	41.1	7.3	8.6	70.9	33.2	15.7	58.0	234.8
9-10	45.1	8.3	9.8	77.7	39.8	17.8	61.4	259.9
10-11	48.4	9.3	10.8	82.8	45.8	19.7	63.8	280.6
11-12	51.0	10.2	11.8	86.6	50.9	21.2	65.5	297.1
12-13	53.0	10.9	12.6	89.2	55.3	22.5	66.7	310.2
13-14	54.6	11.5	13.4	91.3	59.0	23.5	67.5	320.8
14-15	55.7	12.1	14.0	92.9	62.1	24.3	68.0	329.1
15-16	56.4	12.5	14.5	94.0	64.8	24.9	68.3	335.4

tive years, per a *total population of 10,000*. (The distribution of population used was that as given by the Dominion Census of 1911, for London, Canada.)

With the average number of cases for the years given is compared the probable number of cases, per year, in the same group of children. This is deduced from the percentage of children attacked when at a certain age (Table 6) as follows;

The figures for the first and second year of life, given in Table 6, represent the probable number of children who will be attacked in the next year of life out of the two groups of children, 100 just born and 100 just one year old respectively.

In any population the children under one will have lived one half year on the

average, those between one and two, one and a half years. Hence the problem resolves into finding the probable number of cases, per year, in the case of a group of children whose ages are (at the first of the year) $\frac{1}{2}$ year, $1\frac{1}{2}$ years, etc., the distribution of population by age being as used above.

Therefore the probable number of attacks per year for 100 children *aged one* as returned, is approximately the probable number for 100 children *aged one and one half exactly* which, in turn, is the mean value between the percentage of children attacked when under one year of age, and when one year of age as given in Table 6. These mean values were used in deducing the results of this table.

(This Table is representative of London, Canada.)

TABLE 9.

SHOWING THE ESTIMATED NUMBER OF CASES FOR LONDON OCCURRING IN THE POPULATION UNDER 16 YEARS, PER A TOTAL POPULATION OF 10,000.

Year.	Chicken-pox.	Diphtheria.	German measles.	Measles.	Mumps.	Scarlet fever.	Whooping-cough.	Total.
1907.....	96	14	22	199	148	22	125	626
1908.....	92	9	26	158	146	20	128	579
1909.....	93	12	21	133	97	28	124	508
1910.....	103	15	28	154	81	40	131	552
1911.....	119	9	31	154	95	37	99	544
Average.....	101	12	26	160	113	29	121	562
Probable No. of cases per 10,000 population per year.....	95	22	26	161	111	42	117	574

It will be noticed that the probable number of cases per year agrees very closely with the average number for the five different years, for all the infections except diphtheria and scarlet fever. This exception can be easily explained by a previous conclusion, namely, that these two diseases are decreasing in prevalence.

The above results lead to the estimate of probably 2,800 to 2,900 cases, occurring in the population *under 16*, from all seven infections, per 50,000 total population.

In the report of 1913 the estimate of the number was 3,700, for the same population. This difference can be explained as follows:

1. The estimate of 1913 includes that for *pneumonia* as well as for the seven infections treated in the present report.

2. The estimate of 1913 was for the population *under 21*, while in the present report it is for the population *under 16*.

3. The estimate of 1913 was for a

population in which the numbers of children in each age group were in standard proportion, while the numbers at each age of a group were not. The proportion of the children at ages where the chances of attack are lowest was lower than the proportion in a standard population, while at the ages where the chances were highest it was higher.

These three facts would all tend to make the estimate of 1913 higher than that of the present report.

Table 10 gives a comparison between:

- (a) The estimated average number of cases occurring, per year, among the children *under 16 years* of a total population of 58,000 (the present estimated population of London) and (b) the actual number of cases reported in the year 1915 for London.

NOTE—The estimated number is obtained simply by multiplying the probable number as given in Table 9 by 5.8.

TABLE 10.

SHOWING (A) THE ESTIMATED PROBABLE NUMBER OF CASES THAT OCCURRED IN LONDON FOR THE YEAR 1915, (B) THE ACTUAL NUMBER OF CASES REPORTED IN LONDON FOR THE YEAR 1915.

	Chicken-pox.	Diphtheria.	German measles.	Measles.	Mumps.	Scarlet fever.	Whooping-cough.	Total.
A.	551	128	151	934	644	244	679	3,331
B.	65	151	0	80	24	38	8	366

TABLE 11.

SHOWING (A) THE MORTALITY RATE BASED ON THE REPORTED CASES, (B) THE PROBABLE ACTUAL RATE.

	Measles.	Scarlet fever.	Whooping-cough.
Rate based on reported cases.	3.8%	5.3%	12.5%
Rate based on estimated actual cases. ....	.3%	.9%	.2%

It will be noticed that, according to this table, diphtheria is the only infection treated in the table, for which the reported cases represent the actual number in existence.

The absolute worthlessness of the statistics as obtained from the cases as reported in London is demonstrated when we consider Table 11.

This table compares the case-mortality rate based on the reported number of cases with that based on the estimated actual number.

SUMMARY.

The chief fallacies of this census method as brought out by this report are:

(a) In cases of the younger children a card was sometimes not returned for children who had not had an attack of at least one of the seven infections.

(b) In cases of the older children an attack was sometimes forgotten.

These two fallacies might be eliminated by:

(a) Confining the census to a certain group of children, such as the school children only. It might then be possible to receive returns from all.

(b) Confining the census to a limited period of time, for instance, requiring only whether the child had had an attack in the five preceding years, and if so, the age, etc., at time of such attack. This might tend to eliminate the forgetting of attacks.

While it is admitted that this census method of collecting morbidity statistics may show many fallacies, it is an improvement over methods already in use in that it gives more complete statistics, especially of the milder contagious diseases.

Special thanks are due to the Public and Separate School Boards, to Mr. C. B. Edwards, Inspector of Public Schools, and to the principals and teachers of all the schools, for their coöperation in collecting the data necessary for this investigation.

THE RELATION OF THE HOSPITAL AND DISPENSARY TO OCCUPATIONAL DISEASES.

W. GILMAN THOMPSON, M. D.,

Professor of Medicine in the Cornell University Medical College in New York City.

Read before the Vital Statistics Section, American Public Health Association, September 8, 1915.

IN THE present state of knowledge of the occupational diseases in this country, the natural sequence under the title of this paper comprises:

(1) The encouragement of the physician to recognize and fully report cases of occupational diseases.

(2) The encouragement of hospital and dispensary authorities to adopt a uniform detailed nomenclature of the occupations of patients admitted to these institutions, and to issue to them circulars of information.

(3) The establishment of special occupational diseases dispensary clinics.

(4) The establishment of hospitals equipped for the detailed study and the treatment of the occupational diseases.

(5) Provision for the publication of the results observed or obtained.

(1) The education of the physician in the occupational diseases should begin with the training of the medical student, and no student should be allowed to present a case at clinic without full knowledge of the details of the patient's occupation, and the menace to health, if any, which it involves. For the physician the "reporting laws" now existing in more

than a dozen states serve to direct attention to a subject almost completely neglected in this country until within a very few years past. These laws, at present covering scarcely more than a half dozen occupational diseases, should be expanded as they have been in England, to include at least thirty such diseases. The state, furthermore, can do much educational work by furnishing printed information in compact form for all physicians, but especially for those interested in hospital and dispensary work. This can best be done through the state labor bureaus or health boards. I believe that the State of New York Bureau of Labor took the initial step in this matter. A Committee on Occupational Diseases, which I organized a few years ago in New York City, coöperated with Mr. Leonard W. Hatch of the State Bureau of Labor in the preparation of a small booklet, comprising a tabulated list of the more important industrial diseases, with their chief symptoms and the various poisons causing them. The list is incomplete in that it does not tabulate the dusty trades, and should be expanded to include them, with other occupational hazards, but in so far as it extends it has been copied already by several other states.

A further step has subsequently been taken by Dr. David Edsall for the Massachusetts General Hospital by publishing a similar list in placard form to be hung on the walls where physicians in hospital and dispensary attendance may have ready access to it.

This list, with certain modifications, has been adopted by the Associated Out-patient Clinics of the City of New York for general distribution. It is to be supplemented by a placard tabulating the more important dusty trades and certain other occupations, including, for example, the hazards of working in a deleterious environment, as in excessive temperature, humidity, light, noise, etc., and should include a list of occupational postural deformities. Thus equipped, the dispensary physician should soon learn to recognize the occupational diseases with a thoroughness now sadly neglected.

(2) The dispensary and hospital authorities should furnish special history blanks for the accurate recording of the histories of all occupational diseases. Such blanks may be issued in comprehensive groups, as for instance, one to cover the diseases due to metal poisons, another the respiratory diseases due to dust inhalation, etc. Such blanks (copies of which are herewith submitted), I have had in use in my Cornell Medical Clinic for several years and they have proved invaluable as an aid to diagnosis. To make such blanks of maximum value, however, two things are essential. First, by coöperation, they should be made as nearly uniform as possible in different institutions, and

second, a uniform standard nomenclature of occupations and the detailed industry under each occupation should be adopted. This, however, owing to the modern subdivisions of labor and the great diversity of occupations, is an exceedingly complex problem. The Bureau of the United States Census has this matter under present study, and whatever standards it ultimately establishes should be universally adopted by hospitals and dispensaries, for in this way only can reliable morbidity data be obtained on a sufficient scale to justify whatever legislative control of many hazardous occupations may prove desirable. At the present time, if one collect at random the annual statistical reports of any half-dozen metropolitan hospitals and dispensaries, it may be possible to determine how many Hungarians were treated, or how many Roman Catholics or Lutherans, or how many John Smiths, or possibly how many hatters; but how many of the hatters worked as "pouncers" and acquired chronic mercury poisoning in consequence, no one could possibly learn from the published reports, and yet that may be the sole reason why such a victim sought hospital or dispensary relief! A more absurd waste of energy than the average hospital statistical report could scarcely be devised!

A further important function of the hospital, and particularly the dispensary, consists in furnishing the patient afflicted by an occupational disease with a printed circular of information as to how to take care of himself and how best to avoid the hazards of his

occupation in future. That patients appreciate such information I have had ample proof in my clinic where it is distributed. [A sample circular on lead poisoning and one on cardiac diseases was here presented.] Patients not only study these leaflets themselves, but pass them to their fellow-workmen, and return to ask for more.

(3) The establishment of occupational diseases, dispensary clinics in the larger cities, or wherever hazardous trades are being conducted upon a large scale, is most desirable. During the present year the first definite clinic of this type in New York City has been opened by the Health Department and has already demonstrated its usefulness. The advantage of such a clinic is that it focuses attention upon a most important group of diseases. The physicians in attendance become trained in matters of etiology and diagnosis which might otherwise be overlooked, and the patients learn to seek relief for symptoms which perhaps they had not previously associated with their occupation, and bring their fellow-workmen for examination. Such a dispensary, moreover, affords a field for intensive study and investigation destined to become of far-reaching benefit. It may not be necessary to establish a separate dispensary in many places, but it is easy for any large general dispensary to organize an occupational diseases class, with physicians in attendance who are particularly interested and trained in the work. The equipment of any such class or complete dispensary

should include ample laboratory facilities for work in clinical pathology and clinical chemistry, otherwise much important work in diagnosis cannot be undertaken.

(4) It is still a problem how far it is necessary to go in the establishment of occupational diseases hospitals, and it is possible that for some time to come the specialized dispensaries may fulfill the needs of the situation. The occupational diseases, with one or two exceptions, like the caisson disease, differ only epilogically, and in no wise pathologically from the same diseases as met with apart from conditions of labor or manufacture. The fibroid phthisis of the emery grinder does not differ from that of the octogenarian, nor is the chronic bronchitis of the furrier essentially different from that acquired in many other ways. The caries of "phossy jaw" in the matchmaker differs mainly in extent and severity from caries otherwise acquired and presents no new pathological phenomena. Moreover, the treatment of the occupational diseases is practically identical with that of similar diseases originating from many causes. The essential things are the early recognition of occupational diseases symptoms, the appreciation of their etiology and of the means of prophylaxis. It is therefore quite possible to treat the occupational diseases adequately in any general hospital, although for the sake of intensive study it may be appropriate to set aside one or two wards for the grouping of such cases. What really is needed is not mere hospitals for these diseases, but complete path-

ological institutes in which all the etiological and pathological factors may be studied thoroughly both experimentally and clinically. Such research work is much wanted, for example, to determine the effects of inhalation of nitrous fumes in the manufacture of high explosives, the depth to which various noxious dusts actually penetrate into the lungs, etc. The general hospital, moreover, is not usually equipped with adequate facilities for the treatment and study of many occupational diseases which come under the head of the "specialties," as, for instance, the effects upon the eye of electric flashes, as in electric arc welding, the many postural deformities, dental lesions, cutaneous lesions and neuroses due to occupation. More accurate study of the blood and urine in many cases of poisoning by toxic metals, gases, vapors and fumes demands elaborate laboratory equipment and trained investigators rarely to be found in the general hospital of the type at present existent in this country. There can be no question of the value to the community as an economic investment of a few first class institutes of the type above outlined. Thus far the only one in existence, the one in Milan, opened in 1910, has abundantly demonstrated its usefulness as shown by its annual reports, and many excellent intensive investigations have been prosecuted there. This institute possesses six clinical wards with a capacity of twelve beds each, besides isolation rooms, making a total capacity of eighty beds. There is a large dispensary and a pathological

department with laboratories and a lecture hall. There are chemical and physical laboratories, a library, museum, rooms for animal experimentation, clinical microscopy, calorimetry, and radiography. Apparatus is installed for the study of electro-cardiograms, hydraulic pressure, analysis of explosive and other toxic gases, air analysis, microspectroscopy and microphotography, etc. The institute extends its work through visitation at their homes of artisans unable to attend the clinic, and instruction is given in hygiene to the families and friends of industrial workers. Students receive instruction and public conferences are held for discussion of the occupational diseases hazards. A similar institute with a capacity of 300 beds has been planned for Budapest, and such institutes are greatly needed in this country.

(5) The publication of statistics of the occupational diseases by hospitals and dispensaries is a most important matter, for at present it is with the utmost difficulty that one can collect reliable data as to morbidity in even the most hazardous industries. There is a decided tendency to seek remedies for obvious industrial hazards through legislation which is often hasty and ill advised, passed without adequate provision for its enforcement, and which frequently is unjust to the employer and fails really to benefit the employed. For example, there are states including anthrax and the caisson disease in their reporting laws, which have not a single caisson under operation in the state, and in which anthrax is never met with. This is merely be-

cause their reporting laws have been copied almost verbatim from that of New York State, which in turn copied its law from England. Meanwhile a large number of very important occupational diseases are suffered to remain unreported. Similarly many of the factory ventilation laws directed against dust inhalation hazards are inadequate and ill-advised. The hygienic betterment of the workingmen's environment has meanwhile been undertaken voluntarily by a number of the large manufacturing corporations as an economic gain—instance the United States Steel Corporation, the B. F. Goodrich Company and the duPont de Nemours Powder Company—in a manner most encouraging. And many manufacturing

firms like those of the felt hat industry might be induced to mend their ways voluntarily if the path were pointed out to them through convincing morbidity statistics, accompanied by practical suggestions for betterment. It is preferable to lead than to drive when possible, and this Association might well assume leadership in directing and encouraging the educational campaign against the occupational diseases hazards, through stimulating the collection of reliable morbidity statistics, and promoting uniformity in their tabulation, as well as in formulating suggestions for betterment. And this work should begin by urging upon hospitals and dispensaries their duty in improving their statistical methods.



FIVE SECTIONAL CONFERENCES ON TUBERCULOSIS.

Sectional conferences on tuberculosis will be held during the month of October in New Haven, Conn., Louisville, Ky., Jackson, Miss., Newark, N. J., and Albuquerque, N. M., under the auspices of The National Association for the Study and Prevention of Tuberculosis, according to a bulletin issued recently.

The Louisville conference, which will comprise the Mississippi Valley States, will meet first on October 4, 5 and 6. The New England States Conference at New Haven will meet on October 12 and 13; the Albuquerque Conference, taking in the Southwestern States, on October 13 and 14; the North Atlantic States Conference at Newark on October 20 and 21, and the Conference for the Southern States at Jackson on October 30 and 31.

The governors of every state in the territory of each of these conferences will appoint delegates, and the mayors of practically all of the principal cities will send representatives. Chambers of commerce, state and county medical societies, anti-tuberculosis associations, women's clubs and other civic and social groups are being urged to send delegates to the conference in their various districts. The programs of each conference will be suited to the locality in which the

conference is held. Speakers of national prominence will be present at these meetings.

The states comprised in the New England Conference are Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, and Connecticut. The North Atlantic Conference states are New York, New Jersey, Pennsylvania, Delaware, Maryland, Virginia, West Virginia, and the District of Columbia. The Southern Conference states are North and South Carolina, Tennessee, Georgia, Florida, Alabama, Mississippi, and Louisiana. The Mississippi Valley Conference states are Michigan, Ohio, Indiana, Kentucky, Illinois, Wisconsin, Minnesota, Iowa, Missouri, Arkansas, Kansas, Nebraska, North Dakota, and South Dakota. The Southwestern Conference will take in the states of Texas, Oklahoma, New Mexico, Colorado, Utah, Arizona, Nevada and California.

Anti-Tuberculosis workers are urged now to make plans to attend the conference in their own district or the one nearest to them.

Information about any of the conferences may be obtained from the office of The National Association for the Study and Prevention of Tuberculosis, 105 East 22d Street, New York.

THE HANDLING OF SHUCKED OYSTERS.

CARLETON BATES,

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Read before the Laboratory Section, American Public Health Association, Rochester, N. Y., September 10, 1915.

CONSIDERABLE attention has been given by bacteriologists and others interested in sanitation to the question of shell oysters. In the control of food shipments, the control of shucked or opened oysters is of equal importance to that of the shell stock. The control of the shell stock more particularly interests those officials charged with the enforcement of food laws in whose territory the oysters are grown. A systematic investigation is at present being carried on with regard to the pollution of the oyster beds throughout the entire Atlantic coast. These investigations are being conducted by coöperation between the various state officials, the Hygienic Laboratory, of the Treasury Department, and the Bureau of Chemistry, of the Department of Agriculture. The control of the sale of shucked oysters, however, more particularly interests inland food officials because of the greater amounts of oysters which are shipped inland in this condition.

Inland officials generally have no means or facilities for the examination of the shell stock or the inspection of shucking plants prior to the arrival of shipments into their territory. For the information of all parties interested, a series of experiments were conducted during the past oyster season with a view of studying the handling and shipping of the shucked stock to inland points. The work was undertaken in coöperation with the Kentucky Agricultural Experiment Station, to which place commercial shipments were made. Upon receipt of the shipments, the Kentucky officials conducted a series of experiments with regard to the control of the oysters during the sale through retail stores. A brief report of this part of the investigation was made by R. M. Allen* in his address before the Oyster Growers' & Dealers' Association of North America at the last annual meeting, held in Washington, D. C.

The investigations herein reported were conducted from January 1 to April 1, of this year. The general procedure included the analysis and

inspection of the shell stock and of the shucked stock during each step in the process of preparation, such as, shucking, washing, chilling, and packing. All of the work was conducted in connection with the preparation of regular commercial shipments on a commercial scale.

Considerable improvement has been made during recent years in the sanitation of shucking establishments. The methods employed have also been changed, but during the course of the investigations old and new methods of preparation of the product for market were followed. These methods vary chiefly in elaborateness, the aims of both methods being the same.

Shell oysters after being received at the shucking houses are opened by skilled shuckers, these oysters being collected either in pails permitting the draining of the shell liquors, or in pails partially filled with water. After a shucker has a full pail, the opened stock is delivered to the washer, where they are washed for varying lengths of time. After washing, the oysters are chilled in water. At this point, the procedure varies greatly; in some instances oysters are chilled by being placed in a tank of ice water and allowed to remain for short periods of time, the oysters being agitated or not, according to the practice of the dealer. In other instances the oysters are placed in tanks of chilled water and agitated by means of air or water, or both. This latter method is known as the mechanical washer and chiller. After chilling, the oysters are drained on a culling board and are packed in the containers for shipping.

During the investigations the method for the bacteriological examination of oysters, as outlined by the writer and L. A. Round in a previous paper,† was employed. One of the facts developing from the work was a study of the bacteriological condition of the oyster meats during each step in the handling process. As has been reported,‡ in the examination of the shell stock, a composite sample of the shell

*Published in JOURNAL, August, 1916.

‡A Comparison of Bacteriological Methods for the Examination of Oysters by Carleton Bates and L. A. Round, to be read before the Laboratory Section of the A. P. H. A. on September 7-10, 1915.

*The *Oysterman and Fisherman*, Vol. XII, No. 34, p. 38.

liquors was first collected, from which five determinations were made and scored on the basis of the present "Standard Method." In this way, a comparison of the scores of the meats could be secured with that of the liquors.

These experiments consisted of fifteen shipments from the commercial houses to inland points. In view of the fact that the work was

conducted on a commercial scale and with regular commercial shipments, the results obtained are doubly interesting. With each shipment, which was packed in ice, a second box was sent which contained a thermograph, also iced, to show whether or not the packages were re-iced in transit. The results of the shipping experiments are as follows:

TABLE SHOWING COMPARATIVE BACTERIAL COUNT AND B. COLI SCORE OF OYSTERS DURING VARIOUS STEPS IN THE HANDLING AND BEFORE AND AFTER SHIPMENT.

Ship- ping experi- ment No.	Description of sample.	Date of examina- tion.	Meats.		B. coli score.	Liquors.		B. coli score.
			No. of colonies devel- oping on plain agar after.			No. of colonies devel- oping on plain agar after.		
			4 days in- cubation at 25° C.	48 hrs. in- cubation at 37° C.		4 days in- cubation at 25° C.	48 hrs. in- cubation at 37° C.	
1.	Shell stock, 24 hrs. off bed	1-15-15	2,200	450	1	1,950	430	0
	Same stock from shucker	1-15-15	1,600	150	2			
	Same stock at time of ship- ping	1-15-15	12,900	550	1			
	Same stock at time shipment arrived	1-18-15	140,000	1,500	5	69,000	9,500	10
2.	Shell stock, 6 days off bed	1-19-15	475	30	5	7,500	90	10
	Same stock from shucker's dipper	1-19-15	36,000	32,500	2	62,000	70	0
	Same stock at time of ship- ment	1-19-15	325	21	3			
	Same stock at time shipment arrived	1-21-15	27,500	1,300	41	10,800	950	8
3.	Shell stock 2 days off bed	1-22-15	30,000*	13,500*	50	4,300	1,700†	100†
	Same stock from shucker's dipper	1-22-15	1,600	85	2			
	Same stock from washer	1-22-15	4,100	56	2			
	Same stock at time of ship- ping	1-22-15	5,400‡	130‡	3			
	Same stock at time shipment arrived	1-25-15	49,000	1,300	0	8,000	1,250	0
4.	Shell stock 18 hrs. off bed	1-26-15	1,450	14	0	1,750	70	6
	Same stock from shucker's dipper	1-26-15	1,300	16	2			
	Same stock from washer	1-26-15	12,500	60	2			
	Same stock from chiller	1-26-15	11,500	155	2			
	Same stock at time of ship- ment	1-26-15	115,000	135	3			
	Same stock at time shipment arrived	1-29-15	47,500	750	5	38,500	1,300	2
5.	Shell stock 3 days off bed	1-29-15	70	28	0	370	65	6
	Same stock from shucker's dipper	1-29-15	4,900	28	0			
	Same stock at time of ship- ment	1-29-15	1,900§	27	0			
	Same stock at time shipment arrived	2- 1-15	12,500	1,250	32	30,000	3,100	6
6.	Shell stock 15 hrs. off bed	2- 5-15	1,450||	240||	0	14,400	60	2
	Same stock from shucker's dipper	2- 5-15	1,950	180	3			
	Same stock at time of ship- ment	2- 5-15	13,800	420	1			
	Same stock at time shipment arrived	2- 8-15	31,000	1,900	1	36,000	2,200	4
7.	Shell stock 5½ days off bed	2- 9-15	8,000	225	23	80,000	460	46
	Same stock at time of ship- ment	2- 9-15	30,000	365	50			
	Same stock at time shipment arrived	2-11-15	47,000	5,900	5	63,000	5,800	32

* Average of 2 plates.

§ Average of 3 plates.

† Average of 3 plates.

‡ Average of 2 plates.

|| Only one plate made.

TABLE SHOWING COMPARATIVE BACTERIAL COUNT AND B. COLI SCORE OF OYSTERS DURING VARIOUS STEPS IN THE HANDLING AND BEFORE AND AFTER SHIPMENT.—*Concluded.*

Ship- ping exper- iment No.	Description of sample.	Date of examina- tion.	Meats.		B. coli score.	Liquors.		B. coli score.
			No. of colonies devel- oping on plain agar after.			No. of colonies devel- oping on plain agar after.		
			4 days in- cubation at 25° C.	48 hrs. in- cubation at 37° C.		4 days in- cubation at 25° C.	48 hrs. in- cubation at 37° C.	
8.	Shell stock 2 days off bed	2-12-15	1,500	95	3	7,700	320	10
	Same stock from shucker's dipper	2-12-15	20,000	200	3			
	Same stock at time of ship- ment	2-12-15	20,000	100	0			
	Same stock at time shipment arrived	2-15-15	85,000	800	0	126,000	1,400	0
9.	Shell stock 18 hrs. off bed	2-16-15	700	95	1	1,800	290	4
	Same stock from shucker's dipper	2-16-15	1,250	85	1			
	Same stock from chiller	2-16-15	15,000	35	3			
	Same stock at time of ship- ment	2-16-15	22,000	130	0			
	Same stock at time shipment arrived	2-18-15	40,000	980	0	12,000	450	4
10.	Shucked oysters at time of shipment	2-23-15	56,000	12,000	2	29,000	3,500	2
11.	Shell stock 7 days off bed	2-23-15	6,000	80	1	3,500	350	6
	Same stock from shucker's dipper	2-23-15	18,000	575	0			
	Same stock at time of ship- ment	2-23-15	72,000	34				
	Same stock at time shipment arrived	2-25-15	140,000	2,000	0	118,000	1,900	0
12.	Shell stock 24 hrs. off bed	2-26-15	5,200	275	2	17,500	510	6
	Same stock from shucker's dipper	2-26-15	6,000	4	1			
	Same stock at time of ship- ment	2-26-15	32,000	6	1			
	Same stock at time shipment arrived	3- 1-15	70,000	2,750	4	10,000	1,100	6
13.	Shell stock 24 hrs. off bed	3- 2-15	3,750	300	0	1,670	870	6
	Same stock from shucker's dipper	3- 2-15	3,000	235	1			
	Same stock at time of ship- ment	3- 2-15	9,000	100	0			
	Same stock at time shipment arrived	3- 4-15	29,000	1,500	0	25,000	280	0
14.	Shell stock 18 hrs. off bed	3- 5-15	45	10	5	1,100	390	4
	Same stock from shucker's basket	3- 5-15	1,100	86	23			
	Same stock at time of ship- ment	3- 5-15	120	10	4			
	Same stock at time shipment arrived	3- 8-15	29,000	550	4	39,500	750	2
15.	Shell stock 20 hrs. off bed	3- 9-15	180	36	3	950	50	10
	Same stock from shucker's dipper	3- 9-15	5,700	775	2			
	Same stock at time of ship- ment	3- 9-15	8,500	80	0			
	Same stock at time shipment arrived	3-12-15	34,000	380	2	24,500	475	0
16.	Shell stock 36 hrs. off bed	3-12-15	425	140	1	4,700	425	46
	Same stock from shucker's dipper	3-12-15	1,900	190	0			
	Same stock at time of ship- ment	3-12-15	350,000	325	2			
	Same stock at time shipment arrived	3-15-15	100,000	220	0	170,000	2,200	0

DISCUSSION OF RESULTS.

From the tabulations, it can be noted that the total counts vary greatly with each step in the process of handling. In the case of shell stock, the opening was done in accordance with the description as outlined in the method. In the case of all the other steps, the results represent commercial practices. Naturally, every oyster cannot be cleaned when commercial shuckers are employed to the same extent as is done for laboratory experiments. At the shucking step, considerable dirt from the shell, pieces of shell, grit, etc., get into the shucked stock. The bacteriological counts obtained at this step will, therefore, appear greater than in those reported for the shell stock. After shucking, the oysters are washed and chilled. The general results show an increase in the numbers of bacteria present on the oysters, but the colon types remain practically constant throughout the entire process.

The experiments reported herein represent practices requiring varying lengths of time in the handling. Additional experiments were conducted in connection with these commercial shipments in which the length of time required in the handling was extended. These results were obtained from wholly experimental investigations and are not reported at this time in connection with the commercial work. It can be briefly stated, however, that the colon types of organisms remain constant even when longer intervals of time are employed than is the commercial practice.

The work herein reported more clearly shows the advisability of a method such as has been discussed. It warrants inland officials to draw temporary conclusions regarding the sanitary condition of the oyster beds from which the shucking stock is secured.



AIMING AT VOCATIONAL DISEASE.

That the workmen's compensation principle will ultimately be extended to include casualties resulting from vocational diseases, as well as those arising from accidents, was clearly foreshadowed in a conference held recently between officials of the Pennsylvania State Department of Labor and Industry and physicians and surgeons representing industrial plants throughout Pennsylvania and neighboring states. All concurred in the belief that it is high time to map out a definite course of action to meet the vocational disease problem, and as a result arrangements were made to establish a vocational disease clinic at the University of Pennsylvania Hospital, Philadelphia, under the supervision of Dr. Alfred Stengel. As far as is known, this will be the first clinic of its kind in America.

Doctor Stengel addressed the conference on the subject of extreme temperatures in relation to the workman's efficiency. He is positive that it is impossible for men to live long or do their best work if a "slow parboiling" is an

incident of their employment. He said he hoped to clear up many phases of such industrial questions through the new clinic, but urged that until science had gathered a few more facts employers should err on the safe side and give the men the full benefit of the doubt wherever health is concerned.

In the matter of extreme temperatures, physicians representing the Carnegie Steel Company took a different view. They contended that physical collapse of workmen is due, not to extreme temperatures, but to squalid, insanitary home conditions and improperly prepared food. Dr. J. W. Schereschewsky, of the United States Public Health Service, suggested that shifts be shortened as temperature is increased.

Frequent physical examination of employees and the immediate elimination of any found to be physically unfit were put forth as constituting a plan that would reduce both accidents and contagion to a minimum.—*Factory*, September.

SUGGESTIONS FOR A TEST TO MEASURE THE DRAINABILITY OF EMSCHER TANK SLUDGE.

W. L. STEVENSON,
Assistant Engineer, Sewage Disposal, Philadelphia.

Read before the Sanitary Engineering Section, American Public Health Association, Rochester, N. Y., September 10, 1915.

PRIOR to the use of the Emscher tank, it was expected that sludge from sedimentation or septic tanks would dry slowly, and it was therefore necessary in the design of works to provide ample space to receive and retain the liquid sludge until it had dried to a consistency fit to be removed to a dump.

The thorough digestion of organic matter in the sludge compartment of a mature Emscher tank results in a destruction of the sticky, colloidal matters, a breaking down of organized bodies into finely divided particles, and a material reduction both in the volume of the sludge and in its percentage moisture. It also causes the presence of gas which is compressed when the sludge is in the bottom of the tank, but which expands when reduced to normal pressure as the sludge is withdrawn.

This expansion causes the solid portion of the sludge to float upon the water, which, due to the above described conditions, very rapidly separates at the bottom, as shown in Figure 1. For these reasons, such sludge, applied to underdrained sand beds, will dry sufficiently to be removed in a few days instead of probably weeks or months with other kinds of sludge. The rapid drying permits the use of the same bed many times a year and it is common practice to provide only one square foot of drying bed for each three persons tributary to Emscher tanks. Hence the drainability of such sludge has become an important matter.

The methods of sludge analysis in most common use consist in determining the percentage moisture and specific gravity of the wet mass and the percentage of the dry residue that is fixed and that which is fat or soluble in ether. These tests are principally of value to show, in an indirect way, the good or bad qualities of

the sludge, and it seems that an additional test is required to measure drainability.

The real and essential properties of sludge, when it must be disposed of on land adjacent to habitations, are odor, volume and drainability. The writer is not acquainted with any better apparatus than the nose for determining the first, a foot rule for the second, and for the third the results of a few experiments are here offered in the hope that from them a simple test may be devised.

For some time it has been the writer's practice, in order to determine the propriety of removing sludge from Emscher tanks, to withdraw a small portion, place some on a white enameled plate, as suggested by Doctor Imhoff, and another portion in a glass measuring cylinder to see if the water would separate out at the bottom.

Since April of this year a composite sample of each batch of sludge placed on the drying beds at the Pennypack Creek Sewage Disposal Works has been submitted to the two following procedures:

A portion amounting to 700 cc. is placed in a 1,000 cc. measuring cylinder and the amount of clear water separated at the bottom observed and recorded at hourly intervals. This is continued until the sludge begins to settle down into the water again.

Another 700 cc. portion is placed in a vertical piece of glass tubing of the same internal diameter as the measuring cylinder. Over the lower end of the tube is secured a piece of wire screen which supports a one-half-inch layer of small pebbles, a one-half-inch layer of clean Jersey gravel, and a two-inch layer of fine sand. (The thickness of these layers could probably be reduced and thereby decrease the amount of entrained drain water.)

The tube is held in a retort stand over a funnel resting in a measuring cylinder to collect the water draining out of the sludge and the

accumulated amount of water is read at hourly intervals until the sludge ceases to drain. Apparatus shown in Figure 2.

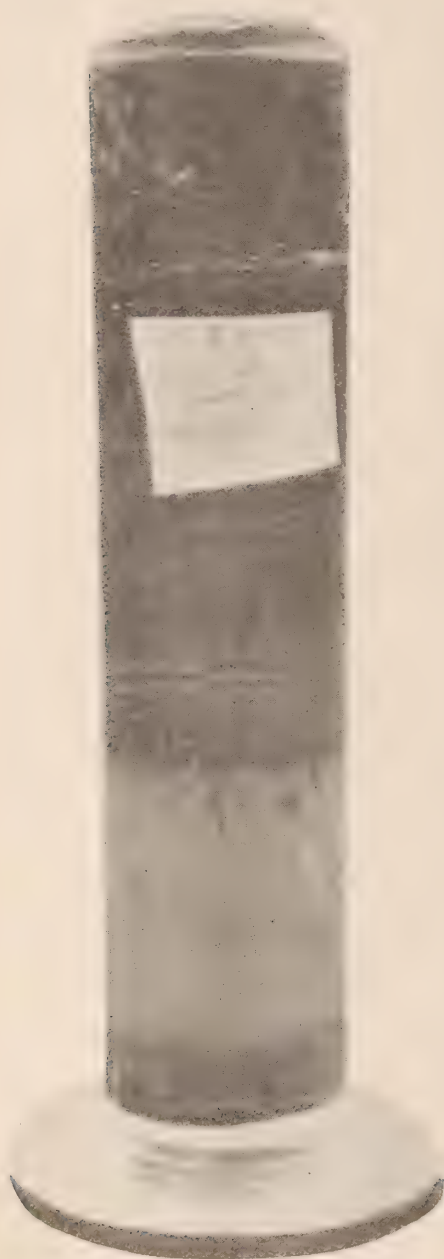


FIG. 1.

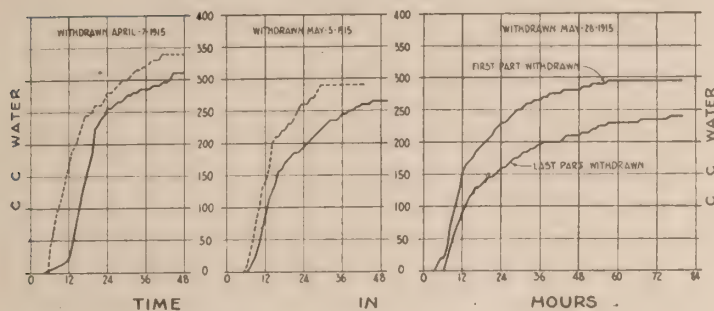


FIG. 2.

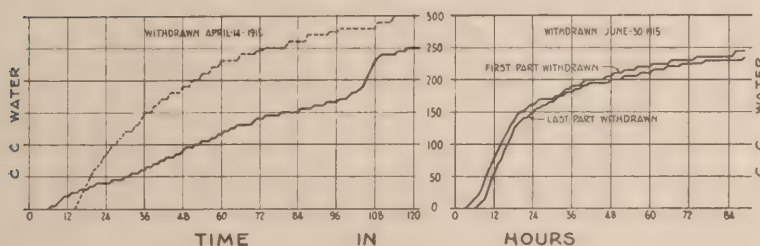
The results of the experiments are shown in Figure 3, also the usual analyses; the number of days required for the sludge, exposed to the weather on the drying beds, to reach a consistency fit to remove; and the rainfall and air temperature during those times.

It may also be stated that sludge from Em-scher tanks No. 1 and No. 2 was unsatisfactory during the early operation of the plant and was found to be highly acid. This condition was corrected by the addition of lime water by means of a pipe extending through the ventilator to about mid-depth of the sludge.

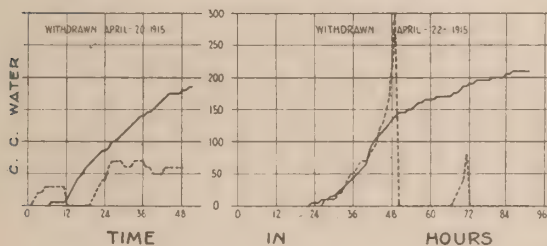
EMSCHER TANK NO. 2.



EMSCHER TANK NO. 1



FINAL SETTLING BASIN



SLUDGE DATA

SOURCE	DATE	WET SLUDGE		SLUDGE		DRY RESIDUE		COULD BE REUSED FROM SAND BED DAYS
		% DRYING MOISTURE GRAVITY	% DRYING MOISTURE GRAVITY	% DRYING MOISTURE GRAVITY	% DRYING MOISTURE GRAVITY	% DRYING MOISTURE GRAVITY	% DRYING MOISTURE GRAVITY	
EMSCHER TANK NO. 1	4-12-15	28.5	28.5	28.5	28.5	28.5	28.5	10
EMSCHER TANK NO. 2	5-5-15	28.5	28.5	28.5	28.5	28.5	28.5	10
EMSCHER TANK NO. 2	5-28-15	28.5	28.5	28.5	28.5	28.5	28.5	10
FINAL SETTLING BASIN	4-22-15	28.5	28.5	28.5	28.5	28.5	28.5	10

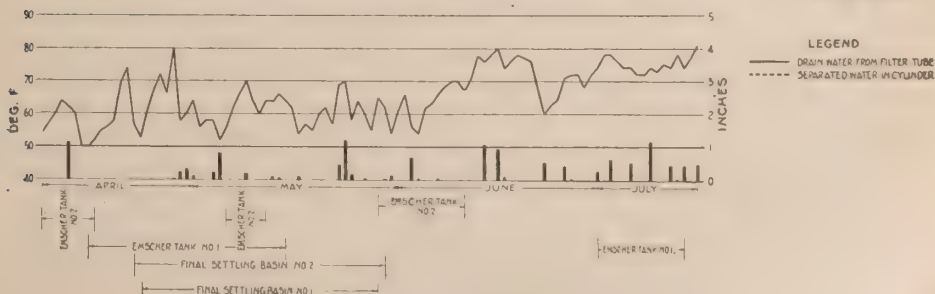
1st FIRST PART
2nd LAST PART

TESTS OF DRAINABILITY OF SLUDGE

AIR TEMPERATURE AND RAINFALL

CITY OF PHILADELPHIA
BUREAU OF SURVEYS
SEWAGE DISPOSAL DIVISION

W. H. Anderson
ASSISTANT ENGINEER
JULY 1915



The settling basin is constructed in two parts. Instead of cleaning the side in service when it shows bubbling, the practice is to place the other side in service and allow the sludge to digest with a small flow of filter effluent passing over it. This has resulted in a practically inodorous sludge; but the water does not drain readily as from Emscher tank sludge.

In several instances the sludge placed in the measuring cylinder has begun to float on the water, after a few hours settled down, then separated and floated again.

Such action prevents obtaining a useful curve of drainability and it appears that the tube with filtering media is the better method.

An examination of the curves indicates that the factors which should be combined to obtain a number to represent the drainability of the sludge are:

(a) The rate of drainage represented by the slope of the first part of the curve.

(b) The ratio between the amount of water drained from a liter of sludge and the amount

of moisture therein as determined by the usual evaporation method.

(c) The time required for the water to begin to drain out.

Good sludge will be indicated by (a) having a steep slope, (b) showing a large number for the ratio, and (c) showing a short time; bad sludge the reverse.

No attempts have been made to combine these three factors to form a number similar to the relative stability figure for filter effluents because the data are too meager and only sludge from one works treating a sewage which is two-thirds institutional has been used in the experiments.

But the writer believes that more extended study in some of the sewage works or testing station laboratories might develop a simple field test capable of being made by the type of operator usually found in the smaller works and that its use would serve to indicate a very important characteristic of Emscher tank sludge.



REAL PUBLIC HEALTH SERVICE.

Periodically we feel like alluding to and growing enthusiastic over one of the most brilliant pieces of public health service that we have ever known. We refer to the control by the United States Public Health Service of the bubonic plague situation in New Orleans.

Some two years ago, it will be remembered, there were eighteen or twenty cases, very close together, of bubonic plague in our southernmost city, most of which terminated fatally. In any other circumstances this would have been a quarantinable epidemic, and would have given rise to most acute alarm throughout the United States and indeed throughout the world. A high wall would have been built about New Orleans, constructively speaking, and intercourse with the rest of the world would have been prohibited, or put under such restrictions as to shut the people of that city off from social or commercial intercourse with the rest of the country. Immediately when this epidemic gave its first signs, the Public Health Service stepped in; that mere fact quieted whatever alarm may have started, and

the justification for the country's entire confidence in that service is shown by what has transpired since. Not one single individual has had his freedom interfered with, not a steamer and not a train have been delayed or put out of service. The city of New Orleans has had as free communication with the rest of the country as any other city, and yet an immense amount of work has been done. The last human case of bubonic plague occurred in September, 1915, but only last week two rodent cases were confirmed. Intensive trapping of rodents and rat-proofing of dwellings was instituted in the neighborhood of their occurrence.

Since the first human case occurred in New Orleans two years ago, 795,186 rodents have been captured, of which 7,223 were captured during the week ending August 5, 1916. Down to date, 122,281 buildings in New Orleans have been rat-proofed. This is a record that needs no adjectives to describe.—*Modern Hospital*, September.

THE PROVIDENCE CITY HOSPITAL.

D. L. RICHARDSON, M. D.,

Superintendent, Providence City Hospital, Providence, R. I.

Read before the Massachusetts Association of Board of Health, Providence, R. I., July 27, 1916.

THE City Hospital has for its purpose the treatment of all kinds of infectious diseases.

As completed in 1910 there were seven buildings situated on a 25-acre lot, and had a capacity of about 140 patients. In 1912 another building was added to accommodate patients suffering from advanced tuberculosis, and in which there are 60 beds, bringing the total capacity of the hospital up to about two hundred beds.

Its purpose has been to care for more than scarlet fever, diphtheria, and measles patients, for it stands ready to accept any kind of transmissible disease, and thereby rendering a widely useful service to the community. Many patients come from other hospitals and charitable institutions, from boats arriving at Providence, and some from the surrounding cities and towns when there is room for such. Many patients prove not to have any infectious disease, but are detained until they are well or a diagnosis has been made. Cases are not inspected before admission.

The treatment of so great a variety of infectious diseases in a few wards has been made possible by the introduction of aseptic nursing. The transmission of virus from one person to another takes place in most infectious diseases in this climate by more or less intimate contact with the sick patient. Air as a medium of infection is theoretically

possible, but is of very little practical importance, except at very short range when a patient may expel by coughing or sneezing definite particles of secretion into one's face.

Aseptic nursing is not difficult to understand nor hard to carry out, once physicians and nurses fully realize its underlying principles, namely, the physical separation of patients suffering from different diseases, and the proper sterilization of everything which comes in contact with these patients. It is nothing more than the technique practiced in every operating room.

Patients are brought to the hospital either in an ambulance or a town car, depending on the age of the patient, and whether he is too ill to walk or sit up. The ambulance driver and attendant wear washable coats, and the attendant sees to it that the patient comes in contact with interior of the vehicle as little as possible. Between trips the coats, blankets, and pillow slips are changed; the driver and attendant wash their hands, and only the interior in contact with patient is washed with soap and water.

Since the opening of the hospital to September 1, 1915, 4,446 patients had been transported to the hospital in this way, and I am satisfied that no patient has contracted an infectious disease from the ambulance or attendants.

The patient is first deposited in an

admitting room, where all outside clothing is removed and the patient made ready for examination. In some wards no admitting room is used and the patient goes directly to the bed assigned. At this point it is highly important that the admitting physician see the patient promptly to make a diagnosis and send him to the proper room or ward. Mistakes in diagnosis on admission are frequently the cause of later trouble. If there is no doubt about the diagnosis the patient is placed in the same unit with others suffering from the same disease.

All new patients are kept in side rooms for an observation period of one week. The rooms do not contain over three or four beds. If at the end of the period nothing further develops and the diagnosis seems certain, he is transferred to the convalescent ward. These new cases are indicated by cards marked "Detention."

In case patients are admitted to a ward with a doubtful diagnosis or suffer either from mixed infection or some other disease than is treated in that ward, the bed or door of a room for a single patient is designated by a red card with the word "Barrierred" on it. Whether such patients are in single rooms or a room for several patients the cards indicate separate units, and the nurses see to it that patients in different units do not mingle, and carry out rigid asepsis between these units.

There are in use either one or two wards for scarlet fever, one for diphtheria, and three others for various other infectious diseases. In two of the latter only graduate nurses or pupils who are especially capable are

employed. Into these two are placed all chicken-pox and measles patients, and a few other highly transmissible infections like smallpox, or typhus fever. These wards are also used for any other infectious disease as well as patients kept for observation.

Contained careful observation of the patients by physicians aided by nurses must be maintained to detect the onset of any other infectious disease at the earliest possible moment.

To simplify the technique only the rooms occupied by patients or toilet rooms to which they go are considered infected area. The corridor, the utility rooms and admitting rooms are used just as in any general hospital. But anyone who has touched any patient or anything in this room must scrub the hands before leaving, and all utensils must be cleaned or sterilized when removed. Infected linen is sent to the laundry, all possible utensils are boiled, some nursing articles are washed with soap and water and put out in the air, and mattresses and pillows are aired only, except when the patient dies or is discharged during the acute process of the disease, or in the case of smallpox or typhus fever when they are sterilized by steam.

Patients on discharge receive a soap and water bath. Most of the wards are provided with a discharging room into which the patient is placed after his bath, and where he stays until next day when his parents come for him. On discharge of the patient the linen is sent to the laundry; mattress and pillows aired or sterilized; and all utensils either boiled or immersed in an antiseptic solution, the bed,

bed-side table, chair, and lavatory are washed with soap and water, and in the isolation wards the floor and walls within easy reach are also washed with soap and water. Rooms have never been fumigated since the opening record of the room or rooms occupied by each patient, and have never been able to trace any cross infection to this source.

All employees are properly protected against smallpox, and cultures taken when they go on duty. It is highly important to watch all employees for acute illness, and exclude them from service if there is any suspicion of the onset of any infectious disease.

There should be plenty of nurses to care of the patients. In some of the wards there is one nurse for every three patients, in others one for five or six. This is important to prevent breakdown of the technique and furnish the best possible care of the patients. Money spent on skilled medical and nursing care of patients suffering from acute infectious disease, will bring big returns in the saving of life, and prevention of subsequent sequellæ.

Cross infections do occur. The two diseases with which there is much trouble are measles and chicken-pox. The infections with other infectious diseases are very small.

The success or failure of the methods outlined may be judged by the incidence of secondary diseases among patients, and hospital staff.

From March 1, 1910, to January 1, 1916, 6,748 patients had been discharged from the hospital and suffering from the following diseases:

Chicken-pox.....	56
Diphtheria.....	1,592
Measles.....	448
Rubella.....	28
Scarlet fever.....	1,415
Syphilis.....	1,280
Tuberculosis.....	784
Whooping-cough.....	157
Other diseases and mixed infections.....	988
Total.....	6,748

Among them occurred 166 cross infections. The diseases contracted were as follows:

Measles.....	48
Chicken-pox.....	78
Scarlet fever.....	19
Diphtheria.....	10
Rubella.....	4
Whooping-cough.....	4
Mumps.....	3
Total.....	166

It will be noted that 126 of the 166 were measles and chicken-pox. The total incidence for the whole hospital was 2.4 per cent. If from the total number of discharges 2,059 adult patients suffering from tuberculosis and syphilis were subtracted leaving 4,689, nearly all of which were children, the incidence is 3.5 per cent. There has never been a cross infection among the 2,059 tuberculosis and syphilitic patients.

It is interesting to analyze still further and note the percentage of cross infection among patients in the three isolation wards where a great variety of infectious diseases were treated. In these wards 2,788 patients, exclusive of adult syphilitics, were treated. The residence of 1,730 was more than seven days and of 1,058 less than a week. Ninety-two cross infections developed, an incidence of 3.3 per cent. slightly less than

for the whole hospital excluding tuberculosis and syphilitic patients.

Among 867 patients treated in these wards during 1913-1914 a careful analysis of the histories was made to determine how many there were who might by immunity have been protected from contracting scarlet fever, diphtheria, measles, chicken-pox, and whooping-cough.

The results are as follows:

SCARLET FEVER

Immune (apparently).....	223
Susceptible.....	448
Unknown.....	173
Cross infections.....	3

DIPHTHERIA

Immune (apparently).....	154
Susceptible.....	517
Unknown.....	138
Cross infections.....	1

MEASLES

Immune (apparently).....	428
Susceptible.....	275
Unknown.....	143
Cross infections.....	5

CHICKEN-POX

Immune (apparently).....	150
Susceptible.....	507
Unknown.....	143
Cross infections.....	7

WHOOPING-COUGH

Immune (apparently).....	230
Susceptible.....	431
Unknown.....	146
Cross infections.....	1

Nearly all instances of infectious diseases arising among employees have occurred among pupil nurses. These nurses come from several New England hospitals for a two months' training in infectious diseases.

From March 1, 1910, to March 1, 1915, the following nurses have been employed in the hospital: Pupil nurses, 353; graduate nurses, 46; attendant nurses, 25; total, 424. Of

the 424 nurses, 64 had previously had diphtheria, and 19 pupils and 1 graduate contracted the disease. It is interesting to note that 9 nurses were diphtheria carriers when they entered upon their duties while only 9 developed the carrier state while working in the hospital. Cultures have been taken routinely when they enter upon their duties and when they leave. One hundred twenty-one had previously had scarlet fever and 19 pupils and 1 graduate contracted the disease; 335 had previously had measles and none contracted it: 50 had previously had rubella and 2 pupils and 2 graduates developed the disease; 184 had had mumps and only 2 contracted this disease.

Among 229 employees, during the same period, 5 contracted an infectious disease; 2 ward maids contracted scarlet fever; 2 laundry maids contracted the same disease; 1 nurse maid contracted both scarlet fever and diphtheria.

In conclusion it is fair to state that air infection if it does take place is rather a rare occurrence; that rigid asepsis is of primary importance. Hospitals for infectious diseases and for children should not have wards of over six or ten beds each and should be provided with sufficient smaller units, whether rooms or compartments, to accommodate all new patients for an observation period. Conservative and accurate diagnosis on the admission of patients and careful supervision will prevent the entrance or continued residence in the same unit of patients suffering from more than a single transmissible infectious disease.

MASSACHUSETTS ASSOCIATION OF BOARDS OF HEALTH.

THE regular quarterly meeting of the Massachusetts Association of Boards of Health was held in the City Hospital at Providence, R. I., Thursday, July 27, 1916, with the President, Dr. Frank A. Woods of Holyoke, in the chair.

It was voted to dispense with the reading of the records of the preceding meeting.

It was unanimously voted to accept the following applicants as members of the Association: Dr. Arthur A. Brown, State District Health Officer, Swampscott, Mass.; Mr. Charles I. Burrows, Board of Health, Lynn, Mass.; Dr. William J. Hatchett, 28 Arlington St., Somerville, Mass.; Miss Grace O'Bryan, 561 Massachusetts Ave., Boston, Mass.; Dr. Thomas Tetreau, City Health Officer, Portland, Me.; Dr. F. Van Nüys, Board of Health, Weston, Mass.

His Honor, Mayor Joseph H. Gainer, Chairman of the Board of Hospital Commissioners, delivered the following address of welcome:

"It gives me a great deal of pleasure, today, as chairman of the City Hospital Commission and as Mayor of the City of Providence, to extend to the Massachusetts Association of Boards of Health, and health officers of the state a very hearty welcome. Our City Hospital is governed, as you know, by a City Hospital Commission. While this Commission is a separate department from the health depart-

ment, it is nevertheless closely affiliated with it. Doctor Chapin, our Superintendent of Health, is secretary of the City Hospital Commission. He has been deeply interested in the hospital since its foundation, and together with Doctor Richardson, the superintendent, is entitled to the credit of its success. Another point of relation between the City Hospital and the City's Health Department is the fact that the Board of Health in Providence is the Board of Aldermen. The Mayor is chairman of that body, and chairman of the Hospital Commission, while two of three elective members of the Hospital Commission, are Aldermen and members of the Health Committee of that board.

"It is therefore appropriate that the City Hospital should furnish a birthday party for the Health Department. Last winter, I am informed, the Health Department of the City of New York celebrated its fiftieth birthday, today, we celebrate our sixtieth birthday.

"Doctor Emerson, the Health Commissioner of New York, while searching the early records for his department, in preparation for its anniversary, found that in preparing the health work of the City of New York in the sixties, New York sought the advice and assistance of the Superintendent of Health of Providence. In a recent study of health work made by Doctor Chapin, he found that Massachusetts ranked first among the States of the

Union. It is no wonder then that our Health Department with its long history of service is pleased and honored to have the health officers of Massachusetts here to help us in our celebration. We trust you will enjoy the occasion with us.

"Ordinarily, we furnish to our visitors the Rhode Island clam. Today, however, as we are entertaining distinguished health officers, we find that we must make a change in our program. We are not giving you the Rhode Island clam, because we have no health officer to guarantee the article. Professor Gorham could give us a very satisfactory guarantee, if the foodstuff in question happened to be oysters, but he has no jurisdiction over clams. In Massachusetts, we understand your health officer, Doctor McLaughlin, has such jurisdiction. We have, therefore, gone to Massachusetts and imported the Massachusetts clam; so we know

you will have no hesitancy in enjoying the dinner now that you know proper health precautions have been taken for your safety."

The following program was then presented:

"The Sixtieth Birthday of the Providence Health Department." By Charles V. Chapin, M. D., Superintendent of Health.

"The Providence City Hospital." By D. L. Richardson, M. D., Superintendent.

"Relative Value of Different Lines of Health Work." By Franz Schneider, Jr., of the Russell Sage Foundation.

A motion of Doctor Palmer was unanimously carried to extend to the Commissioners of the Providence City Hospital a rising vote of thanks for their royal entertainment of the Association.

The meeting was then adjourned.



CHILD LABOR IN THE FAR EAST.

Japan's first child labor law went into effect on June 1. It is a very inadequate law providing a 12-year limit, a 12-hour day, a 7-day week and prohibition of night work between 10 p. m. and 4 a. m. The inadequacy of these provisions is increased by weakening exemptions so that the law can hardly be considered more than an acknowledgment of the principle that the protection of the child is essential to the development of the nation. It is the law of recurrence again. Japan is passing from the agricultural to the industrial stage and is suffering from all the ills that attended similar developments in England and the United States. The strange part about it is that as each country goes through this stage it seems unable to learn from the experience of other countries. Japan has discovered, as did England, that the men

from her industrial sections are not measuring up to military standards. Frightened by this, she raises her age limit from nothing to 12, with exemptions to 10 years, provides a 12- to 14-hour work day, and a working week of 7 days! Yet the standards that other countries have found it necessary to adopt are not unknown to her, for only a year or two ago some of her influential citizens sent to the National Child Labor Committee for information about the child labor movement in this country. Perhaps, though, Japan took as a guide some of the states which have not yet learned their industrial lesson from England and the older industrial states. We still have four states which permit an 11-hour day; three states which have no 14-year limit; and nine states which do not prohibit night work.—*The Child Labor Bulletin*.

MINUTES OF THE FORTY-THIRD MEETING OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.

ROCHESTER, NEW YORK, SEPTEMBER 7 TO 10, 1915.

FIRST SESSION.

The Forty-Third Annual Meeting of the American Public Health Association was called to order at the Central Presbyterian Church, Rochester, New York, Tuesday, September 7, at 9 a. m.

In the absence of President Sedgwick, the meeting was called to order by the Secretary.

On motion, the minutes of the last meeting, having been printed and distributed, were, by unanimous consent, approved without reading.

There being no further business the meeting adjourned.

SELSKAR M. GUNN,
Secretary.

SECOND SESSION.

The meeting was called to order, Tuesday, September 7, at 2 p. m.

This session of the Association constituted the symposium on milk, and the following papers were read:

The Purposes of the Grading of Market Milk. Dr. W. H. Park, Director of Laboratories, New York City Health Department.

The Experience of New York City in the Grading of Market Milk. Lucius P. Brown, Director of the Bureau of Food Inspection of the New York City Health Department.

The Grading of Milk in Small Communities. Dr. Linsly R. Williams,

Deputy Commissioner of Health, New York State.

The Degree of Accuracy of Bacteriological Analyses of Milk. Prof. H. W. Conn, Wesleyan University.

Some Observations upon the Causation of High Bacterial Counts in Market Milk. Dr. H. D. Pease, Lederle Laboratories, New York City.

Sanitary Measures of Primary Importance in the Production of Clean Milk (Illustrated). Dr. C. E. North, North Public Health Bureau.

Vice-President Hastings then took the chair. The papers were discussed by Drs. Clark, Campbell, Hastings, Smith, Slack, Mahady, Robertson, Park, Mr. L. P. Brown, Dr. L. R. Williams, Professor Conn, Dr. H. D. Pease.

Following the discussion Vice-President Hastings called Prof. H. W. Conn to the chair. Mr. F. D. Bell, as Chairman, presented the Report of the Committee on Cold Storage. On motion it was voted to refer the report of the Cold Storage Committee to the Executive Committee.

Upon motion the meeting adjourned.

SELSKAR M. GUNN,
Secretary.

THIRD SESSION.

Open Meeting.

The open meeting of the Association was called to order by President

Sedgwick in Convention Hall at 7.45 p. m., September 7.

The following addresses were given:

Address of Welcome, Hon. Charles S. Whitman, Governor of the State of New York.

Address of Welcome, Hon. Hiram H. Edgerton, Mayor of Rochester.

Memorial address on the life of the late Captain Henry Lomb of Rochester, Dr. Clarence A. Barbour, President Rochester Theological Seminary.

Following Doctor Barbour's address, Dr. Stephen Smith, First President of the American Public Health Association, came upon the platform and was presented by President Sedgwick.

Major-General Wm. C. Gorgas, M. D., then delivered an address in memory of Carlos Finlay, M. D.

Following the address by General Gorgas the Chairman called on Dr. Frederick Montizambert, Director General of Public Health of the Dominion of Canada, who spoke briefly in behalf of the Canadian members of the Association.

Vice-President Hastings of the Association then assumed the chair, and, after calling upon Dr. Montgomery E. Leary for some announcements, introduced President William T. Sedgwick, who delivered his presidential address on "Achievements and Failures in Public Health Work."

The meeting then adjourned.

WILLIAM T. SEDGWICK,
President.

SELSKAR M. GUNN,
Secretary.

FOURTH SESSION.

The meeting was called to order by the President in the old auditorium of the Central Presbyterian Church at 10 a. m., September 8. After an address by Dr. Stephen Smith of New York, First President of the Association, the following papers, constituting the symposium on Public Health Education, were presented:

Organization of a Plan of Public Health Education in New York State. Prof. C.-E. A. Winslow, Director, Division of Publicity and Education, New York State Department of Health.

Printer's Ink as a Life-Saver. E. A. Moree, Assistant Secretary, New York State Charities Aid Association.

Public Health Work through the Press in North Carolina. Warren Booker, C. E., Chief, Bureau of Engineering and Education, North Carolina State Board of Health.

Some Features of Public Health Education in New York City. Dr. Charles F. Bolduan, Director, Bureau of Public Health Education, New York City Health Department.

"Live a Little Longer," the Triple Alliance between the Public, the Physician and the School. Miss Melissa E. Bingeman, Secretary, Live a Little Longer Committee, Rochester Chamber of Commerce.

The Rôle of the Newspaper in the Dissemination of Public Health News. Dr. W. A. Evans, Health Editor, *Chicago Tribune*.

Following the reading of the papers the meeting was opened for discussion. In the course of this discussion, upon motion it was voted that the Presi-

dent of the Association appoint a committee to take some action concerning the newspaper promotion of public health work. This motion was referred to the Executive Committee.

A resolution approving the "Live a Little Longer" plan, outlined by Miss Bingeman, was introduced and referred to the Executive Committee.

The meeting then listened to the report of the Committee on the Revision of the Constitution and By-Laws. This was presented by Dr. Frankel, Chairman. The draft for a constitution was discussed section by section, and certain amendments were adopted by motion.

It was voted that the constitution be adopted. The proposed by-laws were then considered and amended and upon motion it was voted that the by-laws be adopted as amended.

The meeting then adjourned.

The by-laws and constitution as adopted are here set forth at length:

CONSTITUTION AND BY-LAWS.

ARTICLE 1.

Name.

The name of this Association is The American Public Health Association.

ARTICLE 2.

Object.

The object of this Association is to protect and promote public and personal health.

ARTICLE 3.

Membership.

All persons and organizations in the United States of America, the Dominion of Canada, the Republic of Mex-

ico, the Republic of Cuba, and other American nations, in sympathy with the object of the Association, are eligible to membership; provided that honorary members may be elected without regard to their place of residence.

ARTICLE 4.

Officers.

The officers of this Association are a president, three vice-presidents, a secretary, and a treasurer. The president, vice-presidents, and treasurer shall be elected by the Association and shall serve from the close of the annual meeting at which they are elected until the close of the next annual meeting, and until their successors are elected and qualified. The secretary shall be elected by the Board of Directors and shall serve for such a term as it may specify.

ARTICLE 5.

Administration.

Board of Directors. The affairs of this Association shall be administered by a Board of Directors, consisting of the officers, all ex-presidents, a member designated annually by each section, and thirty additional directors. The Association, at its meeting held in Rochester, New York, in 1915, shall elect ten directors to serve one year, ten to serve two years, and ten to serve three years, and thereafter ten directors shall be elected each year, to serve for a full term of three years. In the organization of the Board of Directors, representation shall be given as far as practicable to every section of the nations represented in the Association.

Advisory Council. Nominations of officers and directors shall be made by an Advisory Council. The Advisory Council shall consist of one representative from each state, province, territory, or district; one from each army and navy medical and hygienic board; and one from each federal department or bureau of the nations represented in the Association, dealing with phases of public health; together with one representative not otherwise eligible, to be elected annually by each section of the Association. Provided, that this article shall not be construed to deprive any member of the Association of his right to make nominations.

ARTICLE 6.

Meetings.

Meetings of the Association shall be held at such times and places as may be directed under the by-laws. Twenty-five members shall constitute a quorum.

ARTICLE 7.

Saving Clause.

This constitution shall take effect immediately upon its adoption by the Association, but it shall not be construed to invalidate any act of the Association, or of any officer or committee thereof, done in accordance with the preceding constitution prior to or pending organization under this constitution.

ARTICLE 8.

Amendments.

This constitution may be amended by a two-thirds vote of the members present and voting at an annual

meeting of the Association; provided, that the call for such meeting shall have specified the particular amendment which is to be acted upon, and provided also that no amendment shall be acted upon before the annual meeting following that at which it was proposed.

BY-LAWS.

ARTICLE 1.

Membership.

Section 1. All members of the Association on September 8, 1915, and all persons and organizations subsequently elected to membership, are members of the Association so long as they conform to its constitution and by-laws.

Section 2. Membership is of four kinds: (a) Honorary; (b) Active; (c) Sustaining; (d) Corporate. An honorary member is a person elected to membership of that class by the Association, for distinguished service to the objects for which the Association stands. Organizations not engaged primarily in the conservation and promotion of public health shall be eligible to corporate membership only; other organizations and persons so engaged may be elected as active or sustaining members. Corporate, active, and sustaining members shall be elected by the Executive Committee.

Section 3. The dues of active members are \$5.00 a year; of sustaining members not less than \$25.00 a year; and of corporate members not less than \$50.00 a year. Honorary members pay no dues. Dues are

payable in advance. Such part of the dues paid by any member as may be determined by the Executive Committee shall be applied to the payment of his subscription to the Official Journal of the Association.

ARTICLE 2.

Advisory Council.

Each member of the Advisory Council representing a state, province, territory or district shall be elected by the members of the Association resident in the jurisdiction which he represents, either before or at the annual meeting. His election shall be reported in writing to the secretary, and he shall hold office until the next annual meeting and until his successor is elected. In the event of the failure of any such jurisdictional group so to report, the executive committee shall appoint a representative *pro tem*.

The Advisory Council shall meet not later than the second session of each annual meeting, on the call of the secretary of the Association, and shall report nominations for officers and directors, not later than the day following. Such nominations shall not be acted upon by the Association before the day next following. A quorum of the Advisory Council shall be twenty members.

ARTICLE 3.

Board of Directors.

The planning of the work of the Association, the organization of sections, arrangements for meetings and congresses, and all other matters pertaining to the administration of its

affairs, shall be vested in the Board of Directors, except as otherwise herein expressly provided. The president of the Association shall serve as chairman of the board. The board shall make its own rules.

The Board of Directors shall have power to fill vacancies among the officers and directors until appointed at the next annual meeting of the Association, and to appoint such committees as it may deem desirable.

Seven directors shall constitute a quorum.

ARTICLE 4.

Executive Committee.

There shall be an Executive Committee, consisting of seven members of the Board of Directors. The Board of Directors shall appoint four members, and the president, secretary, and treasurer shall be members *ex-officio*. The executive work of the Association shall be performed by the Executive Committee.

The president may designate any vice-president, or, if none available, a member of the Board of Directors, to serve as acting president in case of the absence or disability of the president, and in the event of his failure to do so, the Executive Committee shall make such designation.

ARTICLE 5.

Meetings.

There shall be at least one stated annual meeting of the Association, at a time and place to be fixed by the Board of Directors. Other meetings of the Association may be called by the board at such times as it deems proper.

ARTICLE 6.

Amendments.

These by-laws may be amended by the vote of a majority of all the members of the Association present and voting at any annual meeting, the call for which shall have specified the particular amendment to be acted upon.

Adopted at Rochester, N. Y., September 19, 1915.

WILLIAM T. SEDGWICK,
President.
SELSKAR M. GUNN,
Secretary.

Following this meeting the members present from various states gathered together for the selection of representatives to the Advisory Council.

FIFTH SESSION.

The meeting was called to order by President Sedgwick in the old auditorium of the Central Presbyterian Church at 2 p. m., September 9.

The following papers constituting the symposium on the Death-rate of the Higher Age Groups were read:

Increasing Organic Disease. Mr. E. E. Rittenhouse, President of the Life Extension Institute.

Possibility of Reducing Mortality from Diseases of the Heart, Blood-vessels and Kidneys. Dr. E. L. Fisk, Director of Hygiene, Life Extension Institute.

Cancer and the Public Health Service. Dr. Francis C. Wood, Director Cancer Research, Crocker Laboratory, New York City.

These papers were discussed by Dr. Haven Emerson, Dr. Woods

Hutchinson, Dr. Hermann Biggs, Mr. Curtis Lakeman.

Following the discussion of these papers the following was presented:

Studies on the Relation Between Vaccine Virus and Post-Vaccination Tetanus. Dr. John F. Anderson, Director Hygienic Laboratory, U. S. Public Health Service, Washington, D. C.

The report of the Standing Committee on Habit Forming Drugs was then presented by Mr. Lucius P. Brown, Bureau of Food Inspection, New York City. A motion to submit copies of this report was referred to the Board of Directors.

The following papers by members of the Standing Committee on Habit Forming Drugs were then read:

The Suppression of the Drug Vice Considered from the Demand Side. J. Frank Chase, Secretary of the New England Watch and Ward Society, Boston, Mass.

Six Months of the Harrison Act. Dr. C. E. Terry, Jacksonville, Fla.

The following papers were read by title:

Drug Education for the Schools. Miss Jeannette Marks, South Hadley, Mass.

State Institutional Treatment of Drug Addicts. Dr. George Donohoe, Cherokee, Ia.

These papers were discussed by Doctors Goodale, Bullard, Harris, J. C. Kerr, A. E. Young, and Mrs. S. H. Adams and L. P. Brown.

The meeting then adjourned.

WILLIAM T. SEDGWICK,
President.
SELSKAR M. GUNN,
Secretary.

SIXTH SESSION.

The meeting was called to order by President Sedgwick in the old auditorium of the Central Presbyterian Church at 9 a. m., September 10. The Secretary presented the report of the Advisory Council.

Meeting of the Advisory Council.

The Advisory Council of the American Public Health Association was called to order by the Secretary at 12 p. m., Mechanics Institute, Rochester, N. Y., September 9, 1915.

The Secretary read the roll call, and 55 members were present.

Surgeon-General W. C. Gorgas was elected Chairman and Dr. D. L. Harris, Secretary.

The following members of the Association were nominated by ballot for the offices stated immediately preceding their respective names:

President, Dr. John F. Anderson, New Brunswick, N. J.; First Vice-President, Dr. George W. Goler, Rochester, N. Y.; Second Vice-President, Dr. Charles J. Hastings, Toronto, Canada; Third Vice-President, Dr. Omer R. Gillette, Colorado Springs, Colo.; Secretary, Professor Selskar M. Gunn, Boston, Mass. (for two years); Treasurer, Dr. Lee K. Frankel, New York, N. Y.

The following members of the Association were nominated for the Board of Directors:

Directors for Three Years: C. Harris, M. D., Memphis, Tenn.; William H. Park, M. D., New York, N. Y.; Livingston Farrand, M. D., Boulder, Colo.; Charles V. Chapin, M. D.,

Providence, R. I.; H. W. Conn, Ph. D., Middletown, Conn.; William M. Cobleigh, Bozeman, Mont.; Guilford H. Sumner, M. D., Des Moines, Iowa; Oscar W. Dowling, M. D., New Orleans, La.; M. P. Ravenel, M. D., Columbia, Mo.; Ernest C. Levy, M. D., Richmond, Va.

Directors for Two Years: Burdett L. Arms, M. D., Montgomery, Ala.; Edwin F. Ladd, Fargo, N. D.; E. M. Wood, M. D., Winnipeg, Manitoba; Jesus E. Monjaras, M. D., Mexico City; Gordon Bell, M. D., Winnipeg, Manitoba; Charles S. Caverly, M. D., Rutland, Vt.; T. D. Tuttle, M. D., Seattle, Wash.; Pearl M. Hall, M. D., Minneapolis, Minn.; Aristides Agramonte, M. D., Havana, Cuba; H. H. Morgan, M. D., Indianapolis, Ind.

Directors for One Year: Maurice M. Seymour, M. D., Regina, Sask.; William A. Evans, M. D., Chicago, Ill.; Charles E. Terry, M. D., Jacksonville, Fla.; Sam E. Eason, M. D., New Albany, Miss.; Hoyt E. Dearholt, M. D., Milwaukee, Wis.; James A. Hayne, M. D., Columbia, S. C.; Wilmer R. Batt, M. D., Harrisburg, Pa.; Raymond B. Fitzrandolph, Trenton, N. J.; John L. Burkhart, M. D., Lansing, Mich.; John S. Fulton, M. D., Baltimore, Md.

The following were recommended for Honorary Membership: Surgeon-General W. C. Gorgas, Dr. Stephen Smith, Dr. Frederick Montizambert, Dr. Henry D. Holton.

W. C. GORGAS,
Chairman.
D. L. HARRIS,
Secretary.

It was unanimously voted that the report of the Advisory Council be adopted. It was voted that the name of Surgeon-General George M. Sternberg be added to the list of Honorary Members presented by the Advisory Council.

The following papers, constituting the symposium on the Administrative Control of Infectious Diseases, were read:

Principles of Administrative Control of Communicable Diseases in Large Cities. Dr. John S. Billings, Director, Bureau of Preventable Diseases, Department of Health, New York City.

The Part Played by Laboratory Methods and Research in the Control of Communicable Diseases. Dr. William H. Park, Director, Bureau of Laboratories, Department of Health, New York City.

The Control of Communicable Diseases in Schools. Dr. S. Josephine Baker, Director, Bureau of Child Hygiene, Department of Health, New York City.

The Part Played by Hospitals in Controlling Communicable Disease. Dr. Robert J. Wilson, Director, Bureau of Hospitals, Department of Health, New York City.

Is the Control of Measles and Whooping-Cough Practicable? F. G. Curtis, M. D., City Hall, West Newton, Mass.

The Control of Scarlet Fever. A. J. Chesley, M. D., State Board of Health, Minneapolis, Minn.

The Value of Isolation Hospitals for Small Cities. C. S. Caverly, M. D., Rutland, Vt.

The Value of the Public Health

Nurse in the Control of Communicable Diseases. C. J. Hastings, M. D., Health Officer, Toronto, Ont.

Disinfection as a Factor in the Control of Communicable Diseases. B. F. Knause, M. D., Brooklyn, N. Y.

The papers were discussed by Drs. G. W. Goler, Sears, Meyer, Solis-Cohen, S. L. Jepson, Edsall, Young, Gillihan, H. Albert, J. N. Hartz, J. Baker, Knause, and Hastings.

This symposium was given under the joint direction of the Section of Public Health Administration and of the New York City Health Department.

Following the discussion, Mrs. Allie C. Clement was granted the floor for the purpose of speaking on the subject of Woman Suffrage. She offered a resolution, which was ordered to be submitted to the Executive Committee.

WILLIAM T. SEDGWICK,
President.

SELSKAR M. GUNN,
Secretary.

FINAL MEETING.

The meeting was called to order by Vice-President Hastings, September 10, at 5 p. m., in the Mechanics Institute. The Secretary read the following announcement:

The Board of Directors begs to announce that Cincinnati was the unanimous choice for the 1916 meeting. The Board also wishes to announce that the four elective members of the Executive Committee are Dr. Evans, of Chicago, Dr. Holton, of Brattleboro, Vt., Dr. Chapin, of Providence, and Dr. E. C. Levy, of Richmond, Va.;

these four men, with the President, Secretary and Treasurer, make up the Executive Committee.

The following resolution, having been approved by the Board of Directors, was submitted to the Association:

WHEREAS, The widespread use of and traffic in patent medicines and secret nostrums constitutes a grave menace to the public health, and

WHEREAS, Such patent medicines and nostrums, because of the deceptive advertising regularly employed in promoting their sale, consistently oppose the influences seeking to educate the public to a better understanding of the nature, causes and proper treatment of disease, and

WHEREAS, The bulwark of this traffic is secrecy and mystery,

Be It Resolved, That the American Public Health Association oppose the sale of patent medicines and nostrums whose constituents are unknown to the health authorities; and

Be It Further Resolved, That this Association heartily endorse the ordinance of the New York City Department of Health, requiring the manufacturers of proprietary remedies, sold without a physician's prescription, to file with the Department a statement of its active constituents and therapeutic claims, and

Be It Further Resolved, That this Association recommend to other municipalities the adoption of this or similar measures for the proper safeguarding of the public health.

The resolution was adopted.

The following resolution having been approved by the Board of Directors was submitted to the Association:

Resolved, The utilization of established educational facilities within any state or city for the education of the entire population both children and adults with respect to the protection and promotion of health should be fostered in every community with the coöperation of the established health authorities.

The resolution was adopted.

Notice was hereby given of a proposed amendment to the constitution as follows:

Amend the first paragraph of Article 5, entitled "*Board of Directors*," by striking out, "at its meeting held in Rochester, New York, in 1915, shall elect ten directors to serve one year, ten to serve two years, and ten to serve three years, and thereafter ten directors shall be elected each year to serve for a full term of three years," and insert in lieu thereof the following: "At each annual meeting shall elect ten directors, each to serve for three years"; so that said section shall read:

"*Board of Directors*. The affairs of this Association shall be administered by Board of Directors, consisting of the officers, all ex-presidents, the chairman of each section, and thirty additional directors. The Association at each annual meeting shall elect ten directors, each to serve for three years. In the organization of the Board of Directors representation shall be given as far as practicable to every section of the nations represented in the Association."

Notice was hereby given of a proposed amendment to the by-laws as follows:

Amend Article 5 entitled "*Meetings*"

by striking out the words "time and" and inserting the following sentence after the words Board of Directors "The time of the meeting shall be determined by the Executive Committee"; so that the said section shall read:

"*Meetings.* There shall be at least one set annual meeting of the Association at a place to be fixed by the Board of Directors. The time of the meetings shall be determined by the Executive Committee. Other meetings of the Association may be called by the Board at such times as it seems proper."

The following resolution was presented:

Resolved, That the American Public Health Association expresses its hearty appreciation of and its sincere thanks for the hospitality which has been shown the Association as an official body as well as to its individual members by the Rochester Public Health Association, the city of Rochester, by the Mayor, and the members of the local committees which have arranged the many necessary details which have so greatly facilitated the transaction of business and have contributed so largely to the success of the delightful entertainments which have been provided, for

the members and the visiting ladies. Especially does the Association extend to Dr. Montgomery E. Leary, Chairman of the local Arrangements Committee, its most cordial thanks for his untiring efforts in perfecting the arrangements and for his continued solicitude for the members of the Association throughout their stay in Rochester, and that Mr. Garret Smith be also included in these thanks.

The Association thanks the New York State Department of Health and the New York State Sanitary Officers' Association for their coöperation in making possible this great meeting of health officials.

The Association further desires to express its appreciation of the courtesy and efficiency of the press of Rochester and of other cities throughout the country which have given publicity to the proceedings of the Association.

The resolution was unanimously adopted by a rising vote.

The Secretary announced that 443 members had registered, 93 more than at any previous meeting in the Association's history.

The meeting then adjourned.

WILLIAM T. SEDGWICK,

President.

SELSKAR M. GUNN,

Secretary.

REPORT OF THE TREASURER.

Financial Report for Year Ended August 31, 1915.

STATEMENT OF INCOME AND OUTGO.

INCOME.

	<i>Total.</i>	<i>Association.*</i>	<i>Journal.*</i>
JOURNAL Subscriptions	\$4,682.35		\$4,682.35
JOURNAL Sales of Copies	308.87		308.87
JOURNAL Advertising	2,230.44		2,230.44
JOURNAL Sales of Bound Volumes	24.70		24.70
Association Dues	3,625.00	\$3,625.00	
Donations	1,785.00	892.50	892.50
Sales of Water Reports	782.73	782.73	
Sales of Milk and Cream Reports	43.45	43.45	
Sales of Transactions	38.00	38.00	
Miscellaneous Income	66.04	66.04	
Totals	\$13,586.58	\$5,447.72	\$8,138.86

OUTGO.

JOURNAL Printing and Mailing	5,185.80		5,185.80
Salaries	3,868.52	1,934.26	1,934.26
Payroll	2,034.51	1,017.26	1,017.25
Stationery and Supplies	402.36	201.18	201.18
Postage	1,063.15	265.79	797.36
Interest	42.01	21.00	21.01
Traveling	190.88	160.62	30.26
Refunds	33.71	18.00	15.71
Miscellaneous Printing	944.01	708.01	236.00
Rent	544.61	272.31	272.30
Discounts	84.49	42.24	42.25
Commissions	68.60		68.60
Convention Expenses—Florida	850.71	850.71	
Convention Expenses—Rochester	250.00	250.00	
Cost of Pamphlets Sold	170.14	170.14	
General Expense	682.39	341.19	341.20
Totals	\$16,415.89	\$6,252.71	\$10,163.18
Loss for Year	\$2,829.31	\$804.99	\$2,024.32

*The figures in these columns are in part estimated. They are only given in order to show the approximate subdivisions of the total income and outgo as between "Association" and "JOURNAL."

AMERICAN PUBLIC HEALTH ASSOCIATION.

Balance Sheet September 1, 1915.

ASSETS.		LIABILITIES.	
Cash.....	\$564.36	Due Rumford Printing Company.....	\$2,857.61
Secretary's Fund Cash.....	19.13	Advertising Contracts Unexpired.....	41.30
Office Cash.....	25.00		
Total Cash.....	\$608.49		
Dues Receivable.....	31.50		
Advertising Accounts Receivable.....	199.43		
Inventories of Salable Stock.....	572.17		
Office Equipment.....	496.84		
Surplus.....	\$1,838.83		
Less Loss for Year.....	2,829.31		
Net Deficit.....	990.48		
Total.....	\$2,898.91	Total.....	\$2,898.91



REVACCINATION AGAINST TYPHOID AND PARATYPHOID FEVERS.

Paratyphoid fever is said to be extremely frequent in the various armies in Europe. There has been no severe epidemic of typhoid since the commencement of the war, but from almost the very outset of hostilities, there has been a somewhat wide prevalence of paratyphoid fever. In the *Medical Press*, August 2, 1916, F. Widal and L. Gourmont point out that on account of the extensive prevalence of this disease, Landouzy, as far back as December, 1914, indicated the practice of vaccination as the sole effective prophylactic procedure that could be adopted to fight successfully against this malady and called for a comparative study of the method of successive vaccination against typhoid and paratyphoid fever respectively, and of that of double vaccination carried out by the injection of a mixture of the typhoid and antityphoid bacilli.

In August of last year such tests were made by one of the writers, who concluded that the final choice should be that of a triple vaccine, consisting of a number of typhoid bacilli equal to that contained in the simple antityphoid injection, and a double number of each of the para-

typhoid bacilli, A and B. This observer has reported experiments of which the results furnished cogent proof of the powerfully immunizing action of such vaccines when heated; and he has also shown that this vaccine had the effect of making the several specific anti-bodies of each of those microbes appear in the blood of the vaccinated individual and has demonstrated the harmlessness of his procedure. Widal and Gourmont state that they have revaccinated with the triple vaccine about 4,000 persons who had previously been immunized with the simple antityphoid vaccine. Furthermore, they always used the triple vaccine even in the persons who had had typhoid, for the reason that they believed that even in such cases it could not be other than advantageous to profit by the supplementary antityphoid vaccination for the purpose of reinforcing the degree of immunity against the typhoid infection itself. In summarizing their results they assert that the triple vaccine suffices for all the requirements of both antiparatyphoid and antityphoid revaccination.

—*Medical Record*, September 9.

ADDENDUM TO "AN ANALYSIS OF APPENDICITIS STATISTICS,"
BY KNUD STOUMAN, VOL. VI., NO. 7, PP. 714-726.

We beg to make the following addition to the article by Knud Stouman, entitled "An Analysis of Appendicitis Statistics," which appeared in the July issue of the JOURNAL. The table reproduced on the following page, showing the specific death-rates by age from year to year in England and Wales from 1903 to 1913, should have appeared on page 720, second column, before the last paragraph. This table was omitted through an error in the JOURNAL office.

SPECIFIC DEATH-RATES FROM APPENDICITIS BY AGE AND SEX, IN ENGLAND
AND WALES, EACH YEAR, 1903-1913.

<i>Males.</i>										
Year.	Under 5 yrs.	5-9.	10-14.	15-19.	20-24.	25-34.	35-44.	45-54.	55-64.	65 and over.
1903.....	12	74	98	99	78	58	47	52	64	67
1904.....	15	75	106	120	82	63	53	63	61	61
1905.....	19	70	112	97	81	56	54	61	69	65
1906.....	31	95	108	123	91	73	63	72	72	38
1907.....	23	74	101	114	83	64	47	66	71	65
1908.....	24	99	107	97	82	61	57	70	76	82
1909.....	35	91	121	102	82	59	62	67	72	74
1910.....	34	103	117	108	84	60	54	77	91	73
1911.....	36	130	144	114	102	79	57	90	95	99
1912.....	30	76	112	98	86	63	54	83	96	95
1913.....	41	103	109	110	77	61	61	75	77	97

<i>Females.</i>										
Year.	Under 5 yrs.	5-9.	10-14.	15-19.	20-24.	25-34.	35-44.	45-54.	55-64.	65 and over.
1903.....	14	48	50	55	49	40	33	37	50	55
1904.....	13	55	66	58	52	38	33	37	41	66
1905.....	15	59	65	65	55	46	41	43	51	62
1906.....	12	79	81	74	44	38	46	42	53	34
1907.....	18	62	68	60	49	35	38	38	46	52
1908.....	21	71	63	62	48	45	40	50	55	61
1909.....	19	92	78	73	45	45	42	46	69	57
1910.....	19	89	79	73	54	44	45	56	55	59
1911.....	28	98	98	66	54	45	46	58	65	78
1912.....	24	80	72	66	60	43	41	49	60	86
1913.....	20	85	88	75	55	49	45	65	64	88

Book Review.

Laboratory Guide in General Microbiology. *Prepared by the Laboratory of Bacteriology, Hygiene and Pathology, Michigan Agricultural College.* Pp. 418+xvi. John Wiley & Sons, New York, 1916. \$2.50, Net.

This volume, prepared under the direction of Professor Giltner, is the outcome of the labors of the present instructing staff and their predecessors in the microbiological laboratory at East Lansing. In scope the book aims to be "a laboratory guide to general microbiology, leaving the particular field of dairy, soil, water, medical and other phases of bacteriology to special guides already in print or at present projected." His aim is, in a sense, defeated for almost half the book is devoted to specialized studies in the lines which were to be left to "special guides."

The volume is divided into three parts. Part I deals with General Morphological and Cultural Methods; Part II with the Physiology of Microorganisms, and Part III with Applied Microbiology. (Air, Water, and Sewage, Soil, Dairy and Plant Microbiology, and Animal Diseases and Immunity.) The book is therefore not "general" nor is it specialized to the point of thoroughness.

About seventy-five pages of Part I are devoted to the routine preparation of glassware and culture media and to the use of the microscope. The methods described for gelatin and agar are not "Standard" methods, nor is there any insistence on Standard Methods at all. Few teachers can probably afford to spend twenty exercises in covering the ground here taken up, and most of the methods given would seem to be better located with other formulæ in the appendix.

The following 143 pages deal for the most part with actual cultural, morphological or physiological study of microorganisms, and cover an interesting range. The exercises on bacterial nutrition, influence of light and temperature and on enzymes are especially to be commended.

Of the special sections on Applied Micro-

biology, those dealing with soil and dairy microbiology, are excellent, leading the student to some conclusions and fundamental data. The twenty exercises are in reality long continued experiments, and have been planned with skill and judgment.

To the sections on Air and Water and Sewage less praise can be given. The whole field of sanitary bacteriology is covered in four exercises, one dealing with presumably pure water, one with a polluted water and the other two with disinfection, with bleaching powder and filtration through Berkefeld filters respectively. Such a snap-shot at the examination of drinking water gives the student a false sense of efficiency and no background of established facts. It may be said, however, that the exercises as here outlined have abundant references to special works on the subject.

Plant Microbiology is limited to a single set of experiments, while fourteen well-planned exercises are given to Animal Diseases and Immunity.

An appendix contains an extended outline for the study of microbiology, formulas for special media, solutions and stains, a few useful conversion tables and a list of text and reference books.

The book has undoubtedly been prepared to meet the teaching needs of a single institution and therefore may not meet the requirements of others, but instructors elsewhere may get from it many helpful suggestions.

It is the nearest approach to data to a General Microbiology laboratory guide, and it will undoubtedly be found of great use in many laboratories, where the carefully worked out experiments will be modified to suit the individual instructor.

S. C. Prescott.

Health Department Reports and Notes.

REPORTS.

Richmond, Virginia.

For the past nine years this city of 154,600 population has been showing a steadily decreasing death-rate "especially in connection with those diseases in which the results our work would most clearly appear," and now the Forty-fourth annual report of this health department shows that a number of new records have been established. The general death-rate is 18.89 per 1,000 population against 19.70 for 1914—the first year on record for Richmond with a death-rate below 19.

One of the chief commendable records is the reduction of deaths from typhoid fever. 1915 gave a death-rate of 12.3 per 100,000 inhabitants, against 14.1 in 1914—and with a single slight exception represents the seventh consecutive year with a lower death-rate from this disease. Nineteen deaths were attributed to typhoid, but the records show that six of these decedents (three residents and three non-residents) contracted the disease out of Richmond and that the diagnosis was doubtful in four of the thirteen decedents who contracted the disease in the city. It is interesting to note the change in the comparative death-rate from this disease among the white and colored races since 1909. In that year the typhoid death-rate was 24.1 per 100,000, the white rate being 24.0 the colored 22.8. In 1911, 1912, and 1913 the colored rate continued lower than the white, but in 1914 with a total rate of 14.1 the white rate was only 9.4 to the colored rate of 22.2, and in 1915 the white rate was 6.1 while the colored was 22.9. Further lowering of the typhoid rate must consequently be brought about by giving increased attention to the colored race.

There were no deaths from measles, a condition unequaled since 1905. Malarial fever caused only one death (colored) and there has not been one death from this disease among the white people for three years. There was only one death from scarlet fever. Diphtheria caused

six deaths from 312 cases, giving a low death-rate of 3.9 per 100,000 inhabitants, though this is higher than for 1914.

Dr. E. C. Levy, the chief health officer, believes that the most remarkable of all figures for 1915 is the greatly reduced infant mortality rate. There were only 442 deaths in the first year of life, against 509 in 1914. Yet the difference is all the more noticeable in view of the fact that by annexation and natural increase the city's population increased from 134,917 in 1914 to 154,674 in 1915. Thus the rate per 100,000 population in 1915 was 285 while in 1914 it was 378. Doctor Levy has refrained from reporting the infant mortality rate by the usual and most reliable method, *i. e.* rate per 1,000 living births, because he feels that he is not receiving a complete reporting of births; but the rate per 1,000 reported births is 127 against 161 for 1914.

There were 263 deaths from pulmonary tuberculosis, equivalent to a death-rate of 170.0 per 100,000 against a rate of 183.1 for 1914, 108 white and 155 colored. The actual reduction is, in the opinion of Dr. Levy, decidedly greater than the figures show on the surface, since in former years quite a number of deaths actually due to tuberculosis were regularly attributed to other causes, particularly to malaria.

For the fourth consecutive year there was a decided decrease in the death-rate from infantile diarrhea. The number of deaths from this disease was 101 equal to a death-rate of 65.3 per 1,000 population the lowest rate on record for Richmond. The single year 1915 had 52 per cent. fewer deaths from this disease than the annual average rate from 1907 to 1911. This decided and sustained reduction since 1912 is attributed almost entirely to the instruction of the mothers as to how to take care of the excreta of her baby, not only to look out for their stools, but to take proper care in the handling of the diapers, and the Richmond mothers

now are made to realize that human excrement is always very dangerous.

In looking over the comparative mortality of the white and colored races, it is found with "monotonous regularity" that the tremendously greater death-rate among the colored people than among the white is still maintained though somewhat improved. In 1914 the colored death-rate was 82 per cent. higher than the white, with non-resident decedents, both black and white, it was 99 per cent. higher. In 1915 the colored death-rate exceeded the white by 48 per cent., the smallest excess recorded. However it is interesting to note that "so remarkable was the decreased colored death-rate in 1915 that it was but slightly higher than the death-rate for the entire population, white and colored in 1907." The excess death-rate among the negroes seems to be due year after year to tuberculosis and respiratory diseases.

In mentioning the educational and publicity work for the future it is advocated and believed perfectly feasible, to form health leagues throughout the city for the purpose of combating peculiarly local problems—for example, mosquito and

fly eradication—and to teach the laws of sanitary science and hygiene.

As in all the reports of Richmond's chief health officer and his subordinates, it is pleasing to note the enthusiasm and thoroughness with which the work throughout the year has been carried on. Space does not permit us to review in detail this report, with its many excellent discussions, particularly on such subjects as skin diphtheria, infant diarrhea and mortality, and the milk question, yet the health men of this country realize the splendid work being accomplished in this city through the health department, and we advise all who can secure a copy of this report to do so, for one cannot but acquire a working knowledge of new methods and theories which have proven their worth.

Changes in the city charter has caused the retirement of the Board of Health and placed the Health Department under an Administrative board. The old Board of Health with Doctor Levy at the helm has made a record during the past ten years of which Richmond may well be proud and set a pace for the new Administrative Board.

"Public Health in East Chicago, Indiana."

Here is a remarkable report. Its title is "Public Health in East Chicago, Indiana," and it is the first report of the department of public health of that city. The report is remarkable for a number of reasons. For one thing, it is a survey, and an excellent survey. It is prepared by Mr. A. W. Hedrich, whose titles are chemist, bacteriologist, and health inspector; Mr. Hedrich is, in fact, with the exception of a girl office assistant, the entire staff of the department.

East Chicago is now a city of about 27,000 population. It has grown very rapidly, having had but 3,700 inhabitants in 1900. The health department expenditures for 1915 amounted to \$3,950, about 14 cents per capita. The salary list, which includes members of the Board of Health, totalled only \$2,200. Under such circumstances one would think Mr. Hedrich had done very well to quarantine the contagious diseases, make sanitary inspections, analyze samples of milk and water and examine specimens for laboratory diagnosis of disease. Yet

he has not only done these things but has made a careful survey of his city.

The report is comprehensive: it starts with a description of the city and its population, and then discusses the following subjects—preventable deaths, infant mortality, communicable diseases in childhood, typhoid fever, tuberculosis, accidental deaths, milk supply, miscellaneous sanitary factors, and the health department as an organization. It closes with conclusions and recommendations, including a detailed scheme of reorganization. The report covers 42 pages and is effectively illustrated with spot maps, diagrams, and photographs. It reads easily, and the discussion is well-informed.

Infant mortality seems to be the most important public health problem in East Chicago. In 1915 diarrhea and enteritis under two years of age was responsible for 21.5 per cent. of all the deaths occurring, giving a death-rate from this cause of 325 per 100,000 population. The city's infant mortality-rate for 1915 was 160 per

thousand births, the rate showing marked variations among the several wards. The rate among foreigners was almost without exception in excess of that among natives, the figure for one ward being 222. Over half the deaths in the city were among children under two; 44 per cent. were among children under one.

The report makes a convincing argument regarding the seriousness of the present life and health losses in East Chicago and for the improvement of the city's public health service. The Board recommends the appointment of two part-time medical school inspectors, two public health nurses, a food inspector, and a sanitary

inspector; and that the department's appropriation be increased to \$10,412 to cover these additions. Certainly the department has done its part: it has made excellent use of the meager funds allowed it, and has prepared a report that places the responsibility for the future squarely up to the city and its common council. One hopes that the energetic and intelligent efforts of this zealous health officer and progressive Board of Health will not be wasted, and that the city fathers will not fail to take advantage of the demonstrated opportunity to save each year the lives of scores of men, women and children in East Chicago.

NOTES.

Checking Up Birth Reports.—Since the New Jersey local boards of health are now required to enforce the birth registration law, it becomes a matter of importance to the local health officer to know when violations occur.

It is easy to discover violations in so far as filing late birth reports is concerned, but the difficulty arises in discovering violations by not filing reports at all. The New Jersey State Board of Health, realizing this, in its June *Public Health News* describes, for the benefit of the local health officer, a method of checking which would seem to be most efficient. Briefly the points are:

1. All infant deaths should be checked with birth reports.

2. In smaller communities the local newspaper should be watched for report of births.

3. House to house canvass, at regular intervals, in the sanitary district. This is deemed by far the most accurate method, but few local boards of health have the facilities for making such canvasses.

4. If possible, arrangements should be made for assessors to secure information concerning births during the past year when they make their annual rounds for the purpose of listing property. Birth reports in this way should be quite complete in rural communities.

5. Coöperation of the police force.

6. Coöperation of women's clubs.

7. Coöperation with the school authorities.

8. Examination of baptismal records of churches that practice such.

9. Coöperation of the visiting nurses.

10. Inspection of hospital records which care for sick babies and maternity cases.

11. Checking birth reports of infant-boarding houses, which must be licensed by the board of health. Special care will be required in such places on account of the frequency of illegitimate births.

12. Babies entered in "Better Babies Contests," babies in the records of infant milk stations and consultation stations, should be looked up to see if their births are reported.

The bulletin goes on to say, "Just what may be expected from checking births can be inferred from the registration test made by the Children's Bureau last year, in which they found that 25 per cent. of the births checked in twenty-four states were unreported. In New Jersey 12 per cent. of the births investigated in nine localities were unreported."



Age Distributions of Poliomyelitis.—It is frequently remarked that the present outbreak of poliomyelitis represents a virulent form of infection—attention being called to the high mortality rate, approximately 20 per cent. On the other hand, it must not be overlooked that the age distribution of the cases shows that the present infection attacks relatively few older children. Thus, for nearly two thousand cases, the age distribution was as follows:

Age.	No. of Cases.	Per Cent.
Under 1 year.....	187	10.6
Under 3 years.....	1,198	67.5
Under 5 year.....	1,471	83.0
Under 10 years.....	1,714	97.3
Over 10 years.....	47	2.7
	1,761	100.0

Judging by the very large diminution in deaths reported from diarrheal disease, in infants under one year, a diminution coincident with the increase in the deaths reported from poliomyelitis, doubt has been expressed as to whether some of the poliomyelitis deaths may not represent cases of mistaken diagnosis. On the other hand, some of the deaths reported in previous years as due to diarrheal disease may, perhaps, have been really due to poliomyelitis infection. A study of all the fatal cases in the present outbreak is now being made in order to shed light on that point; so far it does not indicate that deaths not poliomyelitis have been reported as due to that disease.—*Weekly Bulletin of the New York City Health Department.*

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Infant Mortality and Nationality of Mothers in Chicago.—In a recent bulletin of the Chicago Health Department there appeared, under the above title, the following discussion and table showing infant mortality from diarrheal diseases in 1915 in relation to the place of birth of the mother.

"The U. S. Census classifies population only by country of birth. Thus all Poles are distributed among Germany, Austria and Russia. Therefore no Poles appear in its classification. The school census of 1914 accepted the statements of the families and shows a large number of Poles, who preferred to be so classified. Others, no doubt, preferred to be classed under their legal sovereigns. The classification as to Slavic or Germanic nationality is, therefore, only approximately correct.

"By comparing the percentage of deaths and the percentage of total population, the relative mortality of babies, whose mothers were American or foreign-born, is readily seen. Thus the American-born constitute 64.1 per cent. of the total population, while the babies of the Ameri-

can-born suffered only 25.39 per cent. of the total mortality.

"The mortality of babies of the foreign-born varied widely. Compared with a similar tabulation made in 1910, it is apparent that Chicago became increasingly 'foreign-born' between 1910 and 1914. And this increase was limited largely to the Slavic peoples and the Italians. The Germanic stock decreased from 10.6 to 9.6 per cent. of the total population.

"These figures indicate where instruction of mothers and improved sanitary conditions are most urgent.

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DIARRHEAL DISEASE DEATHS AMONG CHILDREN UNDER TWO YEARS OF AGE DURING THE YEAR 1915 IN RELATION TO NATIONALITY OF MOTHERS.

Mothers Born in:	Deaths from Diarrheal Diseases.	Per Cent. of Total.	Per Cent. of Each Nationality to Total Population.
Poland.....	540	20.58	5.1
Bohemia.....	85	3.24	2.0
Hungary.....	72	2.74	0.9
*Russia.....	230	8.76	4.1
Lithuania.....	12	0.45	0.7
†Other Slavic Countries.....	8	0.30	0.2
Total Slavic.....	947	36.10	13.0
Germany.....	121	4.61	7.8
Austria.....	538	20.51	1.4
Other Germanic countries.....	11	0.42	0.4
Total Germanic..	670	25.54	9.6
Total Scandinavian	33	1.25	4.3
Italy.....	174	6.63	2.4
Ireland.....	39	1.48	2.8
All other foreign-born	27	1.03	3.7
Total foreign.....	1890	72.05	35.9
United States.....	666	25.39	64.1
Unknown nationality	67	2.55	...
Grand total.....	2623	100.00	100.0

* Includes Finland.

† Includes Croatia and Servia.

‡ From School Census, 1914."

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Illinois Health Officials Urge Community Coöperation.—In discussing the problems of the smaller Illinois community, the State Board of Health in its June *Health News* urges the adoption of proper laws by the legislature so that health coöperation between the smaller districts should be made possible. The bulletin goes on as follows:

"If the laws of the state would permit, it would be a much better plan for the adjoining villages to unite on a health officer who could

devote all his time to this work alone, being paid a reasonable salary and not being handicapped by any outside or private business. Very few physicians in private practice are fully competent to do all the work which comes directly under a health officer's supervision, or, if competent, have not the time to devote to it in the way in which it should be done. Not only is it necessary for him to be acquainted with contagious diseases, their diagnosis, means by which they are spread, etc., but he should be able to make bacterial examinations, analyze water, milk, etc. In addition, he must know about plumbing, water supply, housing conditions and other sanitary affairs, such as disposal of garbage and refuse. The work of a public health officer has really become a specialty in itself and if sufficient salary is offered, good men will take up the work. In the end, it would be a matter of economy, as many epidemics of contagious diseases could be prevented and better community health, always a valuable asset, be obtained. To put it on cold grounds, every death in a community is a direct, monetary loss and when this death is due to a contagious, preventable disease, such as typhoid fever, is a disgrace to the community where the disease is contracted.

"If it is impossible, under existing laws, for smaller communities to unite as suggested, the question should be so agitated that the legislature would be forced to take such action as to make it possible and even obligatory. And not until something of this kind can be done will there be anything like adequate care taken of the health of communities at large. It is a well-known fact that no definite action can be obtained from any legislative body until public sentiment is so aroused regarding such action that they are obliged to take notice and this has been particularly true regarding matters of public health. The time is now ripe for forcing the attention of our lawmakers to these necessary reforms and all these things should be constantly agitated until the general public is thoroughly waked up and then, and then only, can proper laws be obtained."



Important Public Health Legislation in Mississippi.—Two important bills, prepared and advocated by the Mississippi State Board of Health, were passed at the 1916 legislature of that state. The first is the establishment of a sani-

tarium for the care and treatment of tubercular patients, not only for treatment of the cases, but also the education of the tuberculous population of the state. The second bill passed deals with the prevention of blindness, particularly in respect to the reporting of "inflammation of the eyes of the new-born" and the administration of prompt and effective prophylactic measures.

The two bills are given in full in the June *Health Bulletin* of the state board of health. Section 5 of the bill creating a state tuberculosis sanitarium is particularly worthy of note. It reads as follows:

"Section 5. Said Bureau for Tuberculosis shall operate and maintain a correspondence school with those suffering from tuberculosis in this State, to the end that the tuberculous population of Mississippi shall be properly advised and directed both as to the methods for attaining cures and as to the methods for preventing the spread of disease to other persons."



"Motion Pictures in a Public Health Campaign.—The first spell of hot weather is the time for municipal authorities to begin their public health campaigns. And the most effective medium is the motion picture. I need only refer to some of the results achieved in this connection to suggest ways and means.

"As is perhaps logical, New York City has taken the lead. The first step in the 'clean-up' campaign, for which Commissioner Goldwater was responsible, was arranging with over eight hundred exhibitors to show advance slides in their theaters. These slides drew attention to such subject as flies, typhoid fever and care of the baby.

"This was followed by twenty free motion picture shows in the parks and on the recreation piers of the metropolis. The program in each case consisted of four reels of the sugar-coated kind, bearing the following titles: 'The Story of a Consumptive,' 'The Production and Handling of Milk,' 'The City Beautiful' and 'The Little Cripple.' Judging from the interest manifested by spectators, the stories got across sure enough.

"Boston, too, inaugurated a campaign along similar lines, with this exception—the programs were not confined to health films. The other subjects shown were current news pictorials, refined comedies and animated cartoons. These

programs drew increased audiences, the average nightly attendance being from 8,000 to 10,000. The exhibitions were arranged by the Committee on Park Shows.

"St. Louis has adopted the plan for two successive seasons. Each park playground was equipped with a portable projection booth and a portable screen, the gas-pipe frames making it possible to construct the latter with practically no delay. The screen was placed fifty-four feet away from the front row of seats, but this space was not wasted, as it came in handy to accommodate children on busy nights. The mixed programs appealed especially to the foreign element, who, for lack of funds, prefer to spend their evenings in stuffy tenements. The performances began at 7.45 and closed about two hours later.

"These free open-air exhibitions, I regret to say, are apt to antagonize the average exhibitor. Such was the result at first, both in Cincinnati and in Nashville, but instead of taking patrons away, the free shows actually produced extra business, converting, as they did, many folk to the movie habit. It is a regrettable fact that the two forms of entertainment come in conflict, for those to whom a dime is nothing will favor the regular show, and consequently the health pictures fail to reach so many people.

"It would not be worth while to hold the exhibitions during the morning or afternoon, since the majority of the population are then otherwise occupied. Perhaps more satisfaction could be obtained were the coöperation of the local exhibitors sought. I know of a showman in Marshville, N. C., who, of his own initiative, set aside one night weekly during the summer for the showing of health pictures. These included the following subjects: 'The Mosquito,' 'The War on the Mosquito,' 'The Fly Pest,' 'Life in Our Ponds' and 'Boil Your Water.' I am certain that it would not be hard to prevail upon the exhibitor to do this, especially when he is shown that he would thus be assisting the community; and even were he not thus disposed, perhaps he would consent to run an occasional picture of this kind on his regular program.

"What stands in the way of the widespread adoption of this medium is the scarcity of suit-

able available subjects, but even this fact need not deter one from carrying out the plan. One can have a film produced along the desired lines. The Massachusetts State Board of Health, for instance, has had two films produced, the stories of which relate to unhealthful living in its chief forms and its harmful effects. The photoplays are entitled 'Bringing It Home' and 'In His Father's Footsteps.' I understand that the Health Board is prepared to lend these productions and to supply a competent lecturer without charge to any organization requiring the service.

"You cannot interest children in health and sanitation by the lecture or the literature routes, but show them a film on the subject and they will readily understand what you are driving at."—Ernest A. Dench, in the *August American City*.

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Glanders Diminishing.—The following summary showing the number of cases of glanders in horses reported to the New York City Department of Health is encouraging evidence of the success achieved by the administrative measures enforced by that department during the year. These measures embraced the sanitary control of all stables in the city, the closing of public horse troughs, the making of specific diagnostic tests for glanders of all horses exposed to a proved case of glanders, the destruction of all reacting animals, the supervision of all horse-shoeing establishments, and the distribution of circulars of information on glanders to all horse owners, stable keepers, horse shoers, etc.

It will be noted that the reduction in the number of cases of glanders reported is progressive and averages nearly 50% in the last two quarters:

CASES OF GLANDERS IN HORSES IN
NEW YORK CITY.

	1914.	1915.	1916.
First quarter.....	229	232	127
Second quarter.....	313	161	82
Third quarter.....	227	145	..
Fourth quarter.....	384	166	..
Totals.....	1,153	704	209

Public Health Notes.

The Medical Care of Children.—It has long been observed that "one of the most important factors which militates against the success of any educational system is the physical inability of the children to take full advantage of the facilities for education which are placed before them.

"The causes of this social and economic loss," says Dr. Franklin W. Bock in *American Medicine* for July, are "largely medical, using the term in its broadest sense, and if the problems of community efficiency are ever to be solved the medical profession must put its mind to the test of devising some plan of medical effort which will prevent and counteract the ill effects of these physical handicaps in our children."

The most recent medical efforts have been directed towards compulsory medical school inspection and this policy "irresistibly bringing us to the point where more or less pressure will be put upon parents in our insistence that physical defects and disability be immediately remedied if possible."

While private philanthropy has in some measure endeavored to provide this means, such work has been confined to so called charity cases. Doctor Bock believes that this is an "illogical and unrighteous principle which makes our children objects of charity. They are our best asset and whether they are of well to do or of poor parents the community owes them the opportunity of living healthful lives if possible."

A number of cities he declares are well on the road to complete socialization of the medical care of children. Toronto, Canada he points out as a community showing the way to the full realization of the logical ideal of medical work for children. She has fifteen dentists in her public schools, paid by the city, under the control of the city, and they give dental care to every child in Toronto who needs it irrespective of the financial standing of the parents. Last year they gave full dental treatment to 6,000 children, and in four years they have reduced the dental necessity in the public schools from 95 per cent. to 65 per cent.

"Toronto has given us the first example of the full realization of the ideal in medical work for children.

"This ideal is four fold.

"First—Under municipal control.

"Second—Financed by the city at large.

"Third—Service given to *all* children.

"Fourth—Clinical units established where the work can be done most efficiently and with the least wasteful expenditure of the time and energy of the children, the school authorities and the parents; namely in the school buildings."

Doctor Bock believes that

"A work of this kind organized in sympathetic coöperation with the health and school authorities would undoubtedly result in a great reduction in our infant mortality and in a greatly increased health and mental standard for the children of the city, and at the same time it would gradually but surely put our children's hospitals out of business."



A Safe and Sane Fourth.—In 1903 the *Journal* began the collection of statistics regarding deaths and injuries resulting from the use of fireworks in the celebration of the Fourth of July, and for fourteen years has fought for a betterment of conditions. In addition to securing data through news-clipping bureaus, blanks were sent to physicians, health officers and hospitals, requesting lists of casualties. From the beginning special efforts were made to obtain information as to cases of tetanus resulting from these injuries. The tabulated figures of injuries and the enormous proportion of deaths from lockjaw in that first year were appalling. In the 1903 report it was shown that 4,449 persons had been injured, and that 466 had died. Of those injured, many had lost their sight, had legs, arms or hands blown off, or were otherwise mutilated for life. Of those fatally injured, 406, mostly children, died from tetanus, or lockjaw. In the report particular attention was called to the fact that the great majority of lockjaw cases had resulted from blank cartridge injuries, and prohibition of their use was urged. Special directions were also given regarding the care of all blank cartridge and other puncture wounds, and the early use of tetanus antitoxin as a prophylactic was strongly advocated. Reprints

of the report were circulated, but not to so great an extent as was done a few years later.

In the following year a gratifying improvement was noted in the reduction of deaths from tetanus—ninety-one instead of 406. Little or no attention was at first paid to the statistics. In spite of the annual publication of the awful results year after year, the number of casualties continued to increase, until in 1908 there were 5,623 accidents, and in 1909 there were 215 deaths, 125 of which were from lockjaw.

In 1908, however, in addition to the statistics previously presented, a table was prepared, giving the casualties in eighty-four of the largest cities. This showed that the majority of deaths and injuries were clearly due to the lawlessness and disorder permitted in these cities. The corollary was also clear that the city governments were responsible, since the annual carnage could be prevented only by restrictive ordinances. The pamphlet containing a reprint of the report of 1908 was sent to newspapers throughout the country. The response was remarkable. The press generally quoted the *Journal's* statistics, naturally emphasizing the figures for the local city and state. The facts touched local pride. Civic and other organizations started campaigns for the suppression of fireworks and the encouragement of a more enlightened celebration. City officials were stimulated to action, and in a single year a remarkable diminution of injuries resulted. That progress, with slight fluctuations, has continued, until this year not a single case of lockjaw resulted from the celebration, and there were less than one-fifth as many injuries as were reported in 1903.

It was a foregone conclusion that, once the public was acquainted with the facts, a change would be demanded. It is apparent that "a safe and sane" celebration of our independence will soon become so widespread that there will be neither injuries nor deaths from this needless cause.—*Journal of the American Medical Association*.

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The Sanitation of Railway Cars.—Dr. Thomas R. Crowder presents a splendid summary of our present knowledge of the sanitation of railway cars in the United States Public Health Reports of August 11, 1916. There is so much known about this subject which is "not so" that it is

refreshing to come across an authoritative statement of our present knowledge in this important field. Most of the literature on the subject contains little of the exact scientific knowledge on which efficient practice must be based.

Doctor Crowder points out that infection in occupied places may be contracted in three ways:

"(1) By direct transmission from person to person through the agency of mouth spray and intimate personal contact; (2) by indirect transmission through food and drink and from the common use of utensils or other facilities for comfort and convenience; and, (3) from infected premises. So far as railway cars are concerned the first of these is the most important. With the exception of a few diseases which are generally conveyed through food and drink, such as typhoid fever, the accumulating evidence of recent years is making it more and more clear that the majority of transmissible infections are passed with relative directness from person to person. We are coming to understand that people, and not things, are the chief agents of disease transmission as well as the sources of infection; that the thing that counts is the actual presence of the infected person."

One of the most serious diseases to which travelers are exposed is pulmonary tuberculosis. Direct transmission through the medium of mouth spray is probably one of the most frequent and important ways of contracting the disease. Railroads, however, cannot deny the tuberculous transportation while they are permitted the freedom of all other places, public and private. The problem becomes therefore mainly personal. The common drinking cup, the common towel, comb and brush should be abolished.

Doctor Crowder believes that

"Ample provision should be made in all railway cars for travelers to keep their hands and faces clean. Lavatories should be conveniently located, supplied with an abundance of water, well drained and trapped, and should have smooth surfaces for easy cleaning. Towels should be constantly at hand and in sufficient quantity for individual use. There should be a place for brushing the teeth—a dental lavatory—in all cars which make long journeys. Using a wash basin for this purpose is to make a cuspidor of it.

"Toilets should be always available, well flushed, perfectly emptying, and capable of easy cleaning. The old type of open hopper, with its updraft of wind and dust and its nearly constant fouling, is disagreeable, and passengers avoid its use, to the detriment of health.

"The fallacious drip machine—the so-called continuous toilet disinfecter—should be mentioned only to be condemned. It does not disinfect; it only distils an odor, sometimes worse than the one it tries to hide, and diverts attention from conditions that need mending.

"In the dining-car we meet the most important of the problems of indirect transmission of disease. Many of the infections may be contracted through the medium of food and drink, and some of them, as typhoid fever, are commonly transmitted in this way. Cleanliness in the preparation and handling of food is therefore all important to the public health. Especially milk and cream and vegetables to be eaten raw must be produced and stored in such a way as to avoid contamination. But more important still is the supervision of the health of dining-car employees to the end that those harboring transmissible infections may be excluded from the service. Periodic examination of cooks and waiters should be made at frequent intervals, certainly not longer than quarterly or half yearly, and those found infected with tuberculosis, venereal diseases, typhoid fever, diphtheria, etc., should be dismissed until complete recovery has taken place."

Very little experimental work has been done on the bacteriology of the railway coach. The work Kinyoun carried on many years ago showed that while there were various pathogens in the dust from the floors and furnishings of cars only a few of them retained their virulence and these in a small degree.

"It is nevertheless desirable that the railroads should take precautions to keep car infection down to a minimum. This may be done in two ways: By mechanical cleaning, which removes the bacteria; or by fumigation, which kills them. Of the two methods, the former is much the more important. Mechanical cleaning will not remove all the bacteria, for it can not remove the last particle of dust or dirt in which they are contained; but if it is well done, not enough will remain to be of any danger to passengers who use the car.

"Ventilation is an always vital sanitary problem. Good air is of prime importance to good health. Ten or twelve years ago attempts to supply good air to railway cars were generally failures. The problem seemed complicated and almost hopeless. It still has its difficult points, but thanks to the enlightening research of the last ten years it is now much simplified. We have learned what good air is: It is air that bears a proper thermic relation to the body. It must be able to absorb the body heat as rapidly as formed, without being cold enough to produce discomfort. It must be warm, but not too warm; it must have motion, but not enough to cause a chilling draft; it must be changed constantly to prevent stagnation and overheating. When these conditions, which are purely physical, are complied with, practically all other things may be left out of consideration. The chemical changes brought about by respiration are ordinarily negligible.

"As yet we do not know the whole hygienic significance of track pollution. It should be studied with care. Two things may conceivably bring danger—either discharges may be washed from the tracks into bodies of water which are used for domestic supply, or they may dry, become pulverized, be blown up as dust by the wind or passing trains, scattered to the neighborhood, or blown into passing cars. Our knowledge is now sufficient to assure us that the first of these dangers is real, and that where track drainage is into domestic reservoirs the protection of the reservoirs is demanded. While it is well known that bacteria are rapidly destroyed in running streams, the drainage from tracks may be much too direct for such action to take place, and where reservoirs are near the lines the drainage must be so arranged that contamination of the water supply will not occur."

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Should Notification, Quarantine and Terminal Fumigation Be Required in Chicken-Pox, Mumps and German Measles?—In March, 1914, the public health council of New York adopted certain sanitary regulations. During the winter of 1915 some criticism was directed at the regulations with the result that an investigation was carried out and a questionnaire sent to eighteen prominent physicians and health officers. The answers received showed marked agreement.

The following conclusions were established.

It would seem to be of great importance to require the reporting of all three of these diseases if any attempt is to be made to control them and abolish them.

Chicken-pox is not infrequently confused with smallpox and is a very contagious disease, and as it occasionally has severe complications it should be controlled, not only from the danger of its being confused with smallpox but also because it may be a serious disease itself.

German measles requires no further control, except that it should be reportable and diagnosis should be confirmed by experts in order to prevent confusion with scarlet fever.

Mumps may be a more serious disease than is supposed and should for this reason be reported. Physicians and health officials too often forget that communicable diseases which are mild in a healthy, well-cared for child, may be a serious factor in the life of a child weakened from malnutrition or improper care.



Poliomyelitis vs. Other Infectious Diseases.—

Great catastrophes teach great lessons, and the greater the catastrophe the more impressive the lesson. Immediately after a disastrous railroad accident, a shipwreck or a sensational fire, in which lives are lost, action is always taken to safeguard the public against such particular incidents in the future. But a broad application of the lesson is seldom, if ever, made. The lesson of the Slocum fire, with its frightful loss of life, was applied only to safeguarding against a repetition of an identical occurrence in the future; the conditions which caused the disaster of the Eastland, for instance, were not anticipated. The sudden development of the present epidemic of poliomyelitis with its mortality and its train of crippled children has awakened special interest in this disease: all over the country boards of health are realizing their responsibility in regard to it. But it must not be forgotten that this particular epidemic is infinitesimal as compared, either in number or in total mortality, with the old enemies that are always with us. We are reminded of this by the *Survey*, which calls attention to the fact that during May, June and July there were 3,205 cases of poliomyelitis in Greater New York, while during the same period there were 9,710 cases of measles.

The latter, like vice, is with us always, and we have become accustomed to it. And yet the total mortality over an extended period from this disease, is far greater than that from poliomyelitis. Diphtheria, scarlet fever and the ever-present tuberculosis are today hardly given consideration; yet the total mortality from any of these diseases is infinitely greater than that from poliomyelitis, including epidemics. We are apt to forget that the latter disease is always with us, and that the present occurrence is merely a "flare-up," just as we have similar exacerbations of the other acute infectious diseases.—*Journal of the American Medical Association*.



Syphilis—Some of Its Public Health Aspects.

—"Whatever the causes and whether or not on the increase, luetic infection presents the greatest of all the sanitary problems which confront the modern world," writes Dr. L. L. Williams in the United States Public Health Reports for August 4, 1916.

Among the circumstances which render the problem of syphilis of such extreme gravity may be mentioned:

(a) The difficulty in obtaining data of its incidence.

(b) The stigma attaching to the disease rendering notification and prompt treatment difficult.

(c) The extent to which it permeates all civilized communities and all strata of society.

(d) Popular ignorance of the great gravity of the disease; few people know anything about the remote consequences.

(e) Extreme chronicity and difficulty of permanent cure.

(f) Frequency and gravity of late manifestations, especially lesions of nervous and cardiovascular systems, affecting many otherwise valuable members of the community while at the height of their economic usefulness.

(g) The large numbers of sufferers innocently infected in the marital relation and otherwise.

(h) The effect in diminishing the birth-rate.

(i) The effects upon the progeny of syphilitic persons in case of survival after birth.

(j) Probable late degeneracy among descendants of syphilitics.

The discovery of the treponema by Schaudinn,

of salvarsan by Ehrlich, and of the blood tests of Wassermann have given the sanitarian instruments by which to meet this great problem. Some of the possible applications of these discoveries may be, says Dr. Williams: 1. In the regulation of marriage. This is admittedly a very difficult question and most of the regulations in this direction are crude and difficult of execution. 2. As preliminary to life insurance. This method holds out considerable promise. Thus, Dr. Williams suggests a lower premium be offered to policy holders who demonstrate a negative Wassermann. 3. As preliminary to entrance into government service. The United States Public Health service has recently insisted on Wassermann tests for candidates for a commission. This is a valuable lesson to the public. 4. As a general compulsory method in military and naval circles, in penitentiaries and reformatories. 5. As an optional method. It may be applied as an option in higher schools, training camps, factories, etc. 6. As preliminary to employment in certain large corporations.

Doctor Williams concludes that

"The suggestions for partial control which have been advanced are those which now seem possible of adoption in practice. To insist upon ideal methods would probably result in failure; practical difficulties militating against the adoption of procedures which intrinsically may be of great value must be reckoned with, and all measures calculated to offend the sensibilities of the public avoided in so far as may be practicable. In other words, more progress will be made in the end by gaining the confidence and arousing the interest of the public, and thereby enlisting their coöperation, than by causing widespread antagonism in the prosecution of an ideally satisfactory campaign for suppression. In the case of the ordinary communicable diseases, like typhoid fever and tuberculosis, the problem is much simpler, yet progress is slow and well-established measures of control are tardily accepted.

"In dealing with the problem of syphilis, on the other hand, we encounter not only ignorance but also a formidable array of erroneous fixed ideas and deeply rooted prejudices which can not

be presently eradicated by the mere marshaling of scientific facts, no matter how cogently presented. Much tact, therefore, will be needed and much restraint must be exercised lest we seriously damage the cause we are advocating by urging radical reforms for which the public is not yet prepared."



Tubercular Infection in Infancy and Childhood.—In December, 1913, the bulletin of the Massachusetts Trustees of hospitals for consumption stated that "the importance of childhood infection is coming to be recognized as a most important factor in the anti-tuberculosis work." This statement summarizes the present day attitude of sanitarians towards this great problem. An excellent article covering the latest work in this direction appears in the *Boston Medical and Surgical Journal* for August, 17, by Dr. Vanderpool Adriance. The following summary gives at a glance the conclusions drawn from this study:

1. A positive von Pirquet reaction is a proof of tubercular infection.

2. Tuberculosis in the adult is the result of a song begun in the cradle.

3. Tuberculosis is largely contracted in the home circle.

4. The number of children infected increases with the years of age.

5. A von Pirquet reaction during the first two years of life signifies a bad prognosis, but the mortality decreases as the years advance.

6. Infection with small doses of the germs at infrequent intervals may gradually establish immunity.

7. Infection with the bovine type of tuberculosis occurs mostly in infancy and childhood, while the human type is chiefly manifested in adult life.

8. The bovine type manifests itself chiefly in disease of the bones and lymph glands of the neck and mesentery.

9. There is a possibility that the milk of immunized cows may be useful in the prevention and treatment of tuberculosis in the human.

10. Pasteurization of milk should be generally adopted.

American Public Health—Infantile Paralysis

Mortality from Infantile Paralysis

U.S. Registration Area
Year
Rate per 1,000,000 Population

Year	Rate per 1,000,000 Population
1908	22.4
1909	28.0
1910	14.59
1911	10.60
1912	11.36
1913	8.64
1914	7.20

Mortality by Sex, 1909-1912

Rate per 1,000,000 Population

Sex	Rate per 1,000,000 Population
Males	10.9
Females	17.7

Mortality by Age, 1910-1912

Rate per 1,000,000 Population

Age	Rate per 1,000,000 Population
Under 5 years	123.6
5-9 years	29.3
10 and over	6.2

Geographical Distribution, 1909-1912

U.S. Registration States
Rate per 1,000,000 Pop.

State	Rate per 1,000,000 Pop.
Pacific	26.0
New England	23.8
Central	23.7
Southern	23.2
Middle Atlantic	19.6
Western	15.1

Mortality by Race, Southern Cities, 1908-1912

Rate per 1,000,000 Population

Race	Rate per 1,000,000 Population
White	22.4
Colored	28.0

Cases by Months in the U.S., 1910-1912

Percentage Distribution



Case Fatality Rate in the U.S., 1910-1912

Number of Cases
Number of Deaths
Fatality Rate, Percent

Number of Cases	10,390.
Number of Deaths	1,910.
Fatality Rate, Percent	18.4

Case Fatality Rate by Age, 1909-1912

Collective Data, Investigated Cases
Under 1 year
1-9 years
10 and over

Age	Fatality Rate, Percent
Under 1 year	17.1
1-9 years	9.8
10 and over	27.6

Pathology

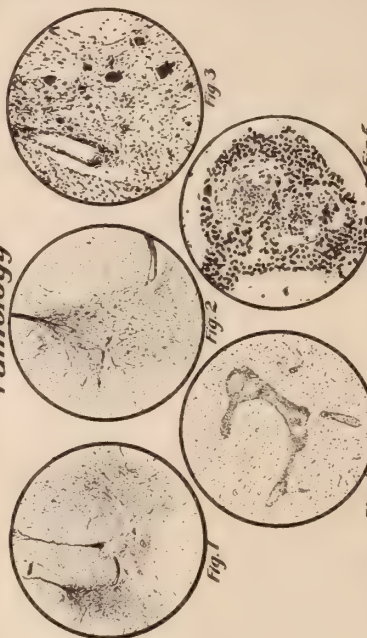


Fig. 1—Cross-section of the dorsal part of a rat case of poliomyelitis. Here there is a contrast between the two horns. The dorsal horn of the anterior horn, and especially the dorsal part, is supplied by an axon of an inflammatory cell. Magnified 7 diameters.
Fig. 2—The same under still higher magnification. Some of the anterior horn cells near the ventral are undergoing atrophy. Magnified 79 diameters.
Fig. 3—The same under still higher magnification. Some of the anterior horn cells near the ventral are undergoing atrophy. Magnified 79 diameters.
Fig. 4—Form of the same section under increased magnification, showing that the periaxonal exudate consists of lymphocytes. Magnified 168 diameters.

Collective Data, Investigated Cases

Type of Disease
U.S. and Sweden
1905-1912
Contact Rate in the U.S. 1910-1912
Per 100 Exposed

Type of Disease	Contact Rate in the U.S. 1910-1912 Per 100 Exposed
Paralytic	77.8%
Asymptomatic	22.2%
Total	100.0%

Under 1 year
1-5 years
6-10 years
11-15 years
16-20 years
21 and over

Age	Contact Rate in the U.S. 1910-1912 Per 100 Exposed
Under 1 year	44.2
1-5 years	53.6
6-10 years	19.4
11-15 years	10.1
16-20 years	9.4
21 and over	1.1

Primary Cases
Secondary Cases

Type of Disease	Contact Rate in the U.S. 1910-1912 Per 100 Exposed
Primary Cases	44.2
Secondary Cases	53.6

Original Tabulation by The Prudential Insurance Company of America.

The pathological illustrations are from Dr. Mervyn Gordon's "Report on Acute Poliomyelitis," Local Government Medical Report, London, 1912.

Industrial Hygiene and Sanitation.

Compensation Bill for Government Employees Now a Law.—The Kern-McGillicuddy bill providing compensation for civilian employees of the federal government who are injured while at work, and adequate compensation for their families in case of death of the employees, was passed by the senate on August 20.

The bill, in the case of permanent total disability of an employee, would grant a pension of 66⅔ per cent. of his salary during life. In the case of temporary total disability the bill would grant 66⅔ per cent. of the loss in earning capacity to the employee. In the case of temporary partial disability the bill would grant to the employee 66⅔ per cent. of loss in earning capacity.

In the event of the death of an employee while on duty the bill grants from 20 to 66⅔ per cent. of the salary of the employee, according to the number of dependents of the employee. This aid continues until the widow dies or remarries and until the children are sixteen years old.

Provision is made in the bill for medical attendance of injured employees. It is believed that such provision will prevent protracted compensation payments. Compensation is to be paid to the employee injured after a period of waiting of three days.

✱

Health Insurance and Degenerative Diseases.—A check upon the increase in degenerative diseases among wage-earners in middle life is found in universal health insurance. Health insurance, it is pointed out in a brief just published in New York by the American Association for Labor Legislation in support of this important piece of social legislation, will bring medical care within the reach of large numbers who are unable to afford this luxury on the present basis of payment. This number, it is estimated, reaches 25 per cent. of the population in a city like Boston. Under health insurance medical care will be paid for in advance on an insurance basis, calling for small weekly contributions. These altered conditions, far from deterring the wage-earner from consulting his physician, when suspicious symptoms appear, will actually encourage him to seek medical

advice. Moreover, these examinations, unlike "physical examinations" for employees as they are conducted today, will result in treatment and continued observation until the sick workman is able to return to work. Aside from this voluntary action of the patient, a periodic physical examination may be developed as one of the regular activities of the democratically controlled health insurance funds. In either case the increased opportunity for early diagnosis, coupled with treatment, may be expected to check the increasing mortality from cancer and degenerative diseases until the average prolongation of life may be as great here as in Prussia, where, under a system of health insurance, there has been a decline instead of an increase in the mortality rates of middle life. Health insurance is a promising weapon with which to fight the premature appearance of the diseases of adult life.

✱

Social Workers Engaged in Mining Camps.—Women trained along medical, social and domestic lines, have been engaged for sociological work in the coal and iron mining camps and the steel plant of the Colorado Fuel and Iron Company.

Dispensary and visiting nurse work will be performed, supplementing the activities of the camp physician and the regular medical department. The nurses will be available whenever needed for illness or emergency operations. They also will visit homes and advise the women on hygiene housekeeping and sanitation.

✱

Six European Nations Now Have Health Insurance for Workers.—In the five years before the present war not less than six European countries adopted compulsory health insurance for wage earners. Thus, populations, totaling some 230,000,000 and including such widely different people as Russians and Dutch, British and Roumanians, Norwegians and Serbs, legislated for health insurance after having seen it in operation in Germany, Austria, Hungary and Luxemburg. State support is also given to health insurance for workers in France, Sweden, Denmark and Switzerland.

These striking facts are made plain in the summer number of the *American Labor Legislation Review*, published by the American Association for Labor Legislation, in which, for the first time in this country is presented a health insurance map of Europe, with a carefully drafted bill for American legislation and an elaborate brief in its support. The map shows that in the course of a few years this new type of social legislation has spread to every civilized, industrial country in the Old World, with a few exceptions, and there are indications that Canada will adopt a similar system at the conclusion of the war.

✱

Pennsylvania Sets Pace in Safety Work.—The industrial board of the State Department of Labor and Industries in Pennsylvania has adopted complete working codes of safety standards for the thousands of workers in the textile and electrical industries of the state.

✱

Safety Subways.—Large tunnels, permitting the ingress and egress of employees without danger of accident, are being installed in the McDonald Mills at Youngstown, Ohio.

Compulsory Health Insurance in Canada.—Compulsory health insurance for wage-earners, which is now being strongly advocated in this country, is pretty certain to be given a further boost by the adoption of the measure as a plank in the platform of the National Liberal party of Canada, led by Sir Wilfred Laurier.

The new Canadian plan includes maternity benefits. There is considerable expectation that the Conservative party will follow the Liberal lead and that legislation will follow soon after the war.

✱

Homes for Munition Workers.—To care for the thousands of men who have come to work in the munition factories, the Bridgeport Chamber of Commerce has organized the Bridgeport Housing Company, with a capital of \$1,000,000, to build homes for workmen.

✱

Warning Against Eye Injuries.—A report recently issued by the Massachusetts State Board of Labor and Industries is authority for the statement that more than 6,000 injuries to the eyes have been reported in the state during the past year.

Personal Notes.

Dr. Donald B. Armstrong has resigned as Director of the Department of Social Welfare of the New York Association for Improving the Condition of the Poor, to become Assistant Secretary and Director of the community tuberculosis experiment of the National Association for the Study and Prevention of Tuberculosis.

✱

Mr. W. E. Brown has resigned from the United States Public Health Service to accept a position in the acoustical department of the H. W. Johns-Manville Company of New York City.

✱

Dr. J. Howard Beard of Urbana, Ill., has been appointed health officer of the University of Illinois.

✱

The following persons were elected to membership in the American Public Health Association:

J. G. Schmidlapp, Cincinnati, Ohio.

Joseph C. Beck, M. D., Chicago, Ill., Physician and Surgeon.

A. J. Lanza, M. D., Butte, Montana, Passed Assistant Surg. U. S. P. H. Service.

Hugo Mueller, M. D., Madison, Wis., Physician, County Health Officer.

Wm. K. Murray, M. D., Chicago, Ill., Physician.

Jacob D. Brook, M. D., Grandville, Mich., Health Officer.

D. W. Crankshaw, M. D., Lawrence, Mich., Village Health Officer.

John R. Hume, M. D., Ph. D., Doniphan, Mo., Physician and Surgeon.

Catherine H. Travis, M. D., Hampton, N. B., Albert P. O'Leary, M. D., Bigtimber, Mont., Physician.

Henry McC. Burnham, M. D., Moss Point, Miss., Physician and County Health Officer.

Thomas J. Carney, M. D., Alma, Mich., Physician and City Health Officer.

Courtenay Dinwiddie, Cincinnati, Ohio,
Superintendent Cincinnati Anti-tuberculosis
League.

T. Eben Reeks, New Britain, Conn., City
Superintendent of Health.

Abel Wolman, Baltimore, Md., Sanitary
Engineer.

George A. Blaylock, M. D., Physician and
Surgeon, County Health Officer, Perryville, Mo.

John A. Gosling, M. D., Tiffin, Ohio, Physi-
cian and City Health Officer.

L. H. Thompson, M. D., Cincinnati, Ohio,
Marine Hospital, U. S. P. H. Service.

Dorothy Child, M. D., Philadelphia, Pa.,
Assistant Secretary Pennsylvania Society for
the Prevention of Tuberculosis.

Joseph D. Halliday, Cleveland, Ohio, Chief,
Bureau of Education, Health Department of
Cleveland.

Truman C. Terrell, M. D., Fort Worth, Texas,
Physician, Practice limited to Bacteriology and
Pathology.

Current Public Health Literature.

AMERICAN.

Albany Medical Annals.

XXXVII. August.

Should Notification, Quarantine, and Terminal Fumiga-
tion be Required in Chickenpox, Mumps, and German
Measles? L. R. Williams.
Systemic Infections through the Oral Cavity. J. H.
Collins.

American Journal of Clinical Medicine, Chicago.

MCMXVI. July.

Alcohol: Its Influence Upon Mind and Body. Bowers.
Vaccine and Serum Therapy in Everyday Practice.
Wolverton.

August.

Vaccine and Serum Therapy in Everyday Practice.
Wolverton.

American Journal of Diseases of Children, Chicago.

12. August.

Observations Upon the Tendency of the Diphtheria
Bacillus to Localize in the Upper Respiratory Tract.
The Importance of this Fact in Routine Culture
Work. D. O. Walthall.
Infantile Scurvy, III. Its Influence on Growth.
A. F. Hess.
Résumé on Infectious Diseases. A. H. Beifeld.

American Journal of Sociology, Chicago.

XXVII. July.

Social Devices for Impelling Women to Bear and Rear
Children. Leta S. Hollingworth.
Youthful Offenders: A Comparative Study of Two
Groups, Each of 1,000 Young Recidivists.
The Organization of Effort. E. A. Ross.
Trade Unions and Efficiency. O. Tead.
Exemption as a Principle of Social Justice. J. H.
Underwood.
The Puritan and His Indian Ward. L. M. Sears.

Boston Medical and Surgical Journal.

CLXXV. August 10.

Asthma in Children, II. Its Relation to Anaphylaxis.
F. B. Talbot.
Preparation of Vegetable Food Proteins for Anaphy-
lactic Tests. E. A. Tracy.
Hay-Fever: Its Treatment with Autogenous Vaccines
and Pollen Extract. L. S. Medalia.

August 17.

Tuberculosis Infection in Infancy and Childhood.
V. Adriance.

The Massachusetts Tuberculosis Dispensaries and
Their Relation to the Practising Physician. J. S.
Hitchcock.

A Year's Work of a Local Tuberculosis Hospital.
A. C. Getchell.

A Suggestion as to the Prevalence of Infantile Paralysis.
W. S. Whittemore.

August 24.

Hygiene of the Mind. B. J. Croft.
Mental Preparedness. J. J. Putnam.
The Meaning of the Mental Hygiene Movement.
W. A. White.

The Menace of Mental Deficiency from the Standpoint
of Heredity. H. H. Goddard.
The Functions of Social Service in State Hospitals.
H. Curtis.

American Medicine, New York.

XI. July.

Communicability of Poliomyelitis. Ira S. Wile.
Medical Care of Children. F. W. Bock.

Interstate Medical Journal, St. Louis.

XXIII. August.

Syphilis and Trauma. W. P. Coues.
The Atypical Primary Lesion in the Early Diagnosis
of Syphilis. J. H. Stokes.
A Review of the Histological Lesions of Syphilis of the
Nervous System. S. T. Orton.
How Shall Latent Syphilis Be Treated. H. C. Solomon.
The Control of Syphilis. Isadore Dyer.
The Margin of Error in the Wassermann Reaction.
I. Simons, R. L. Jones, W. B. Goddard.
Twenty-five Cases of Extragenital Syphilitic Infection.
H. H. Hazen.
The Naming of Syphilis. D. W. Montgomery.

Journal of the American Medical Associa- tion, Chicago.

LXVII. July 29.

The Care of the Children's Teeth: The Most Neglected
Feature of Pediatric Medicine. T. C. McCleave.
The Prognosis of Infantile Paralysis. W. G. Stern.
A Bacteriologic Study of the Causes of Some Stillbirths:
Preliminary Report. J. B. De Lee.

August 5.

Focal Infection in Relation to Certain Dermatoses.
M. L. Ravitch.
The Diet of Children after Infancy. J. H. M. Knox.

August 19.

The Influence of Diet on the Development and Health
of the Teeth. J. I. Durand.
A Study of an Epidemic of Fourteen Cases of Tricho-
niosis with Cures by Serum Therapy. B. F. Salzer.

A Note on the Serum Treatment of Poliomyelitis. Simon Flexner.

Medical Education in the United States, Annual Presentation of Educational Data for 1916 by the Council on Medical Education.

August 26.

Poliomyelitis, With Some Observations on Thirty Cases. A. L. Hoyne and F. P. Cepelka.
Municipal Control of Infantile Paralysis. A. Sophian.
Fourteenth Annual Summary of Fourth of July Injuries.

Journal of Laboratory and Clinical Medicine, St. Louis.

I. August.

Immunity in Syphilis. Hans Zinsser.
A Review of the Complement Fixation Test in Tuberculosis. H. R. Miller.
Focal Infection. J. W. Shuman.
Stupid Words and Statements Commonly Appearing upon Laboratory Reports. B. G. R. Williams and E. N. Williams.

Modern Hospital, St. Louis.

VII. August.

Systematic Health Service for Employees. Lee K. Frankel, Ph. D.
Present Scope of Welfare Work in the Iron and Steel Industry. Thomas Darlington, C. E., M. D.
Provisions for Medical Care Under Health Insurance. Alexander Lambert, M. D.
Illinois Central Railroad Opens New Hospital. Richard E. Schmidt.
Industrial Welfare Work a Factor in Modern Management. J. M. Eaton.
Youngstown Sheet and Tube Company's Hospital. R. J. Kaylor.
Cloak, Suit, Skirt, Dress, and Waist Industries. George M. Price, M. D.
Welfare and Efficiency Achieved at the Same Time. William H. Walsh.
Looking Beyond the Door of Welfare Service in the Department Store. Anne Kendrick Walker.
Welfare Work in a Bookbinding Establishment.

New York Medical Journal.

August 12.

Congenital Syphilis. F. Wise.
Health Insurance from the Viewpoints of the Physician. A. C. Burnham.
Gonorrhea and Its Complications. A. Hyman.

CIV. August 19.

The Control of Epidemics. J. Manning.

August 26.

Typhoid Fever. I. L. Nascher.

New York State Journal of Medicine.

16. August.

Epidemic Poliomyelitis. F. F. Fronczak.
A Study of the Fatality of Chickenpox, Mumps, and German Measles. L. R. Williams.

Public Health Journal, Toronto.

VII. August.

Tuberculosis in Relation to Feeble Mindedness. P. H. Bryce.
Poliomyelitis. W. H. Frost.
The Care of School Children under School Age. D. Forsyth.
The Necessity for Food Inspection. G. R. Mines.

Southern Medical Journal, Birmingham.

IX. August.

Symposium on Tuberculosis.
District Tuberculosis Nursing Plan in Florida. J. Y. Porter.
The Real Value of Climate. C. M. Hendricks.
Some Problems in Public Health Education. J. D. Davis.
Notes from Field Work; Malarial Survey of Impounded Water. H. R. Carter.
Report of Typhoid Fever in Birmingham with Recommendations for Its Eradication. L. L. Lumsden.
Education of the Railway in First Aid Work. A. C. Scott.
Symposium on First Aid.
The Medical Trust. I. W. Cooper.

Texas State Journal of Medicine, Fort Worth.

XII. August.

Pellagra. K. H. Beall.
Some Views on Oxidase Activity in Pellagra. G. D. Fairbanks.
Epidemiology of Pellagra. E. M. Parrish.
Typhus Fever: Prevention and Control. C. C. Pierce.
Epidemic Typhus Fever in South Texas. H. L. McNeil.

United States Public Health Reports.

31. August 4.

Syphilis: Some of Its Public Health Aspects. L. L. Williams.

August 11.

Sanitation of Railway Cars. T. R. Crowder.

August 18.

Poliomyelitis in New York City.
Diagnosis of Plague in Rats. C. L. Williams.

August 25.

Mental Examinations of School Children. Taliaferro Clark.

BRITISH EMPIRE.

British Medical Journal, London.

II. July 1.

Life History of *Ascaris Lumbricoides*. F. H. Stewart.
Disinfection of Nasopharynx of Meningococcus Carriers with Air Saturated with Chloramine. M. H. Gordan.

July 8.

Tuberculin and Vaccines. E. H. Coleman.

July 22.

Industrial Diseases.

Journal of State Medicine, London.

XXIV. August.

Housing Operations and Their Results in Liverpool. E. W. Hope.
How the Poor in Edinburgh are Housed. W. S. Brown.
Dirty Milk.
The Conservation of Lancet Watershed Areas. J. L. Jack.

Lancet, London.

II. July 8.

Use of Tuberculin in General Practice. J. L. Boble.
Use of Ammonia in Chlorination of Water. J. Race.

June.

Housing and Town Planning.
Coöperation between Health Authorities and Medical Practitioners. R. S. Agrawal.
Town Planning: Its Development and Utility. J. W. Cockrill.

Medical Officer, London.

XVI. July 15.

Notes on the Interpretation of the Results of Water Analysis. J. C. Thresh and J. F. Beale.

Public Health, London.

XXIX. August.

The Prevention and Treatment of Venereal Disease.
Phthisis in the Potteries. J. Magill and J. B. McDougal. (With a Note by Sir Thomas Oliver.)
Smells or Effluvia considered from the Chemical, Physiological, and Physiological Points of View. M. Young.
The Bacteriological Examination of Fresh Milk. John Ritchie.

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No. 10

A PLAN FOR EDUCATION IN INDUSTRIAL HYGIENE AND THE AVOIDANCE OF OCCUPATIONAL COMPLAINTS.

J. W. SCHERESCHEWSKY,
Surgeon, U. S. Public Health Service.

Read before the Industrial Hygiene Section American Public Health Association, Rochester, N. Y.,
September 7, 1915.

The keynote to the betterment of conditions of industrial occupation is education. Such education cannot be limited to one class but must include all units of society. Doctor Schereschewsky here discusses the type of education necessary to each unit, the worker, the medical profession, the general public, and suggests methods by which results may be effected.

IT MUST be confessed that this subject is one to be approached in a spirit of diffidence for the reason that the results to be effected are so far-reaching and of such fundamental importance, the methods employed play such a leading part in the final result, and finally, the inauguration of any thorough plan of education will cost so much money, that the writer may well be excused for a tentative spirit in making suggestions.

There would hardly seem need for an extended discussion of the necessity for education in industrial hygiene and the avoidance of occupational complaints. There are approximately from 25,000,000 to 30,000,000 industrial workers in this country, all of whom are more or less exposed to health hazards. While many of these

are the ordinary health hazards, present in the industrial as in any other sphere, on the other hand many of them are inherent to the occupation in question. There can be no doubt but that the steady operation of these hazards exerts a deleterious influence upon the health of the individual, while many of them seriously menace life or curtail the period of productive activity.

One of the most important results effected by the present "Safety First" campaign is that our eyes have been opened to the fact that it is not sufficient to make industries "safe" from an accident standpoint; they should be "safe" from a health standpoint as well. In other words, no industry ought *per se* to exert an injurious influence upon the health of

the worker, in no industry should occupation therein entail curtailment of the period of economic activity.

While, in the absence of reliable statistics, we can only approximate the average yearly loss through the sickness of workers, figures which have been published in Europe enable us reasonably to conclude that the average annual loss through sickness, to workers in this country, is not far from eight to nine days. This would amount to some 600,000 years each year, or an economic loss of \$360,000,000 if average annual earnings are \$600. The loss due to premature physical decline or to reduction in productivity, the result of the continuous operation of industrial health hazards, cannot as yet be estimated. This can only be arrived at as a result of future studies which are highly necessary.

A large part of the loss just adverted to is preventable and is due to lack of knowledge or to carelessness. It need hardly be said that the need for the conservation of human life and health was never more imperative than it is today. The gigantic destruction now going on daily in the vast conflict of European nations only emphasizes the urgency for methods of conservation of life and health. In addition to this, our attention is being repeatedly called to the alarming increase in the so-called "diseases of degeneration." The conclusion seems inevitable that this increase can be due to nothing else but the operation of modern conditions of civilization which have modified, more than in any other particular, the ways in which man gains

his daily bread, *i. e.*, industrial conditions.

Clearly there is need that something should be done. We all know, from the history of campaigns in the interests of the public health in the past, that education is our most effective means for improving health conditions. A more difficult question is the consideration of educational methods and the social groups to whom this education should be directed. A short consideration will convince us that it will not be sufficient to educate workers alone. The field to be covered is more extensive. Not only must the worker be reached but educational measures must extend to the general public and the medical profession.

Any plan for education must, therefore, be general in nature because of the close interdependence of all the units of society. Thus, the education of the medical profession is needed for the purpose of stimulating the interest in the study of diseases in relation to occupation, the improvement in collection of clinical data bearing upon occupational diseases, and the promotion of research work along these lines so that practical recommendations for advances in the sanitation of industries may result.

The education of the general public is required, first, because the history of all our constructive health legislation of the past shows that an enlightened public opinion is necessary to success, and, second, because it is impossible so to delimit the field of industrial hygiene as to separate it from the hygiene of the total environment. Moreover, employers of labor

are an important class of the general public. Their coöperation is necessary if industrial health conditions are to be improved. Finally, the workers, themselves, are to be educated. In order to secure substantial improvement in the health conditions of industries, we must insure knowledge, on the part of the worker, of the general principles of industrial hygiene and the care of his own body. Otherwise, provisions for his health and safety will, in the absence of his intelligent coöperation, be largely nullified.

I will now endeavor to discuss briefly the kind of education each of these three classes require and suggest possible methods by which results may be effected. It is evident, however, the limitations of time will permit only the merest outline.

Beginning with the medical profession, the recognized source of most of our hygienic information, it is only too plain that study of the relation of disease to occupation is regarded as a specialty and something with which neither the general practitioner nor the specialist in other fields is very closely concerned. Yet industrial workers constitute by far the largest class of medical patients. It is evident to any one who examines the clinical records of the average hospital, that with a wealth of material for study, with but a few exceptions, scant attention is paid, for the most part, to the relation of industrial health hazards and of occupational diseases to the morbid history of patients in such hospitals. Even the occupation of patients is imperfectly ascertained, the data on this point in most hospital

histories being so vague and unreliable as to be practically valueless.

The influence of industries upon health is a subject which has been hitherto sadly neglected both in our medical curricula and at the bedside. There is, therefore, need to educate the medical profession to the importance of industrial hygienic measures and the study of the relation of occupations to diseases.

Inasmuch as hospitals are the chief sources of clinical material, hence, the natural locations where intensive studies of disease may be made, it is clear that here must begin the first steps in the education of the medical profession. As Hayhurst has pointed out, the first thing necessary to the utilization of hospitals as centers of education in industrial hygiene, is the adoption of a uniform nomenclature which shall exactly designate the occupation of hospital patients. In taking histories, similar standards are required which will furnish information as to the previous industrial history of the patient and the relation, if any, of this to his previous or present morbid history. At all clinics for the instruction of medical students, stress should be laid upon these points by the demonstrator so that all such students may gain an idea of the important bearing of such data upon disease.

It is also important that death certificates should correctly and exactly indicate the occupation of the decedent. The instruction of the medical profession in this matter is primarily the function of registrars of vital statistics. There is room for improvement in the form of death certificates

themselves in that these should provide more fully for the accurate description of the occupation besides permitting the notation of previous occupations and the time each was pursued. Accurate information of this kind would be invaluable in the study of the mortality of occupations.

The increase in the interest of study of the relation of occupation to disease produced in medical centers of instruction by the measures thus roughly indicated, even if carried out in a relatively small number of hospitals, could hardly fail to produce the accumulation of valuable information.

This, together with the interest aroused in the general medical profession, would not only be productive of useful suggestions for intensive research and the improvement of the hygiene of industries, but the importance of the study of the relation of occupation to disease would also become so well recognized that thorough instruction in this subject would be part of the regular curriculum of medical schools. One important result would be an increase in the number of physicians qualified to undertake the medical care and supervision of large industrial plants.

Turning to the question of the education of the general public and of workers, this will be considered under one head for the reason that the latter are but a subdivision of the former. All are in need of education in these particulars, the only difference being that in the case of workers, the education should be somewhat more specific to suit the occupation followed.

It is plain that, while we may leave,

to a certain extent, at least, the education of the medical profession to centers of medical instruction, some of which, I am glad to say, are recognizing the importance of instruction of this character, the education of so vast a body as the general public must be the result of governmental coöperation, federal, state, and municipal, allied with other civic agencies, such as associations formed for the betterment of industrial conditions and the trades unions of various industries.

Before any such coöperation can be effective to its fullest extent, there is certain preliminary work to be undertaken which, while it need not prevent the initiation of educational measures, will, when completed, add to their force and definiteness. By this preliminary work I refer to the creation of uniform minimum standards of industrial sanitation and legislation. In as much as the federal government is recognized as the standard-making agency par excellence in this country, it would seem that the formulation of the standards referred to is peculiarly the work of federal authorities.

The adoption of such standards, once they are formulated is, of course, the work of the legislative authority of the several states. The adoption of such standards, while not interfering with any additional precautions states or municipalities may see fit to enforce, or employers of labor or labor organizations voluntarily to adopt, will at once give emphasis, clarity and uniformity to an educational propaganda, in that such standards necessarily define the scope of the information disseminated, increase its author-

ity, limit the introduction of irrelevant material, and avoid the advocacy of conflicting measures in various parts of the country.

The history of the educational campaigns of the past, such as, for instance, the crusade against tuberculosis, and the undue mortality of infants, also that of the present campaign for the prevention of industrial accidents, furnish us with a number of means by which information in regard to industrial hygiene and the avoidance of occupational complaints may be generally disseminated.

These summarized roughly are:

1. Permanent exhibits.
2. Travelling exhibits, including moving pictures.
3. Popular lectures.
4. Bulletins issued for popular distribution by federal, state, local health authorities and by private associations.
5. Popular articles published by the Press.
6. Instruction in public schools.

Permanent Exhibits.—The museum of industrial hygiene is a powerful instrument for public education wherever located. Certain museums of industrial hygiene, located abroad, such as the one at Charlottenburg, for example, have aroused much popular interest, necessitating an increase in their funds and enlargement of floor space.

Steps should therefore be undertaken for the establishment of such museums in our important industrial centers. Such a museum is already located in New York City. I believe that such museums should, in size and

importance, be on a par with the magnificent museums of natural history common in our large cities, through which an interested throng of visitors is constantly passing. A sufficient number of such museums of industrial hygiene situated throughout the country would, undoubtedly, play an important part as centers for the dissemination of information in respect to industrial hygiene.

Travelling Exhibits.—One need hardly point out the efficiency of the travelling exhibit, in that it goes to the people, rather than they to it. As the material for such exhibits is naturally limited to the amount and dimensions required for easy transportation, much of the success of such exhibits depends upon the personality and training of the demonstrators who travel with it and the discrimination with which it is planned.

I know of no other way, however, by which such large numbers of persons may be reached and impressed in so short a time as by means of the travelling exhibit. Moreover, such travelling exhibits possess the further advantage that their subject material may be modified to meet the industrial conditions of the region through which it is travelling. In this way the special information needed in the premises is disseminated. As state health authorities frequently employ this method for educating the public in regard to other health matters, the use of such exhibits for educational purposes in industrial hygiene would be merely the extension of former activities.

Naturally, the moving picture forms a means for reaching an extensive

audience which has been largely used in the past for educational purposes. In similar fashion, they constitute an important and readily available means for popular education in industrial hygiene.

Popular Lectures.—Many state and municipal health organizations now possess a staff of lecturers who deliver popular lectures upon health subjects. It can readily be seen that it is practicable to expand existing organizations to provide for the present necessity for popular instruction in industrial hygiene.

I pass over popular articles and bulletins dealing with this subject as their sphere and utility has become well defined through previous public health activities in other directions.

Instruction in Public Schools.—Provisions are made in the public schools of most states for the instruction of school children in hygiene. There is still a tendency on the part of the general public to take such instruction too lightly, or to regard it somewhat in the nature of a fad. Yet all who have investigated this subject cannot but be impressed with the fact that personal hygiene is the most important factor in maintaining the health and efficiency of the individual, due provision having been made to secure healthful places of employment.

In a recent investigation among the garment workers of New York City, made by the Public Health Service, in 1914, neglect of the principles of personal hygiene was found to play a leading part in the incidence of defects and diseases among these workers. Inasmuch as probably one third of all

school children will subsequently engage in industrial occupations, while the great majority of males, in this country, are employed, upon reaching manhood, it seems obvious that the proper time to equip the citizen with the hygienic knowledge necessary to enable him to care for his body properly is not after he has entered a given occupation, but is an essential part of the training of the years of growth and development. Real knowledge of personal hygiene is quite as important for the citizen of the future as a knowledge of reading and writing. It would seem, therefore, particularly in connection with the vocational trend observable in the curricula of our most progressive public schools, that the courses of instruction in hygiene ought to be amplified and modified in such manner that the instruction in personal hygiene shall be thoroughgoing and apply especially, not to the present alone, but to the future maintenance of the body in health, after entrance into an occupation.

We must, therefore, consider the public school as an important instrument for improving the hygiene of workers of the future.

Considering immediate measures to be adopted for the education of the present generation of workers, it must be confessed that the outlook is not so hopeful in so far as the expectation of results commensurate with the effort expended is concerned. No doubt we must await the advent of the succeeding generation for the full fruition of our educational measures. One would hardly expect busy workers of the present, intent upon other

things, suddenly to acquire a lively sense of the importance of industrial hygiene and attention to the care of the body. A fortunate countervailing circumstance is the present campaign in the interests of industrial safety which has already prepared the ground, awakened the minds of the present-day workers to the value of life and limb and set in motion a complicated machinery for education in the prevention of accidents.

The existing apparatus for the promotion of industrial safety should, in addition to the activities of federal, state, and municipal health authorities, furnish a useful nucleus for the propagation of education in industrial hygiene and the avoidance of occupational complaints. Besides this we have the various labor organizations which should be enlisted in an educational movement for the improvement of the health of their members.

There remain the employers of labor. The concept is fast gaining ground among them that the individual is one of society's precious assets; that the condition of his health is not a matter of indifference, that it is poor social economy to subject workers to avoidable industrial hazards. As a consequence many employers are now beginning voluntarily to improve working conditions in their plants, supervise the health of their personnel, and attempt educational measures among them. The conservation of the health of workers, the improvement of conditions of employment, apart from purely humanitarian aspects, have been found to yield increased efficiency and economy in production, have fos-

tered the spirit of coöperation. The prediction may well be ventured, therefore, that employers will be found in a receptive attitude so far as educational measures are concerned.

What they will ask for, and rightly I believe, is precise information as to the improvements it is desired to effect and the practical means for carrying them out. It is here that the establishment of minimum hygienic standards will be especially valuable, as these constitute excellent guides.

There remains for discussion the agencies by which such an educational campaign may be put into operation. This campaign must be a coöperative enterprise. So far as the federal government is concerned, agencies already exist which can contribute their share. For instance, the Public Health Service is empowered by law to study the diseases of man and is conducting investigations in occupational diseases and the relation of occupations to disease. It stands ready to coöperate with state and municipal health authorities in the study of conditions of industrial hygiene insofar as its facilities permit. In some state and municipal health organizations provision is made for the study and the dissemination of information in regard to industrial hygiene and the prevention of occupational disease.

It needs, therefore, only an extension of agencies already in existence and coöperation in order to call into simultaneous being a number of centers making educational efforts. Boards of education can assist in a material way by improving and revising the methods of teaching hygiene in public schools

so that such teaching shall have a vocational trend, *i. e.*, that it shall fit our embryo citizens for their life's battle, with special reference to their future occupations.

Besides these strictly governmental agencies we have trades organizations and associations of private individuals, such as the National Safety Council, who can exert great educational influence among their members. As an example of such organizations may be cited the Joint Board of Sanitary Control of the Cloak, Suit and Skirt and Dress and Waist Trades of New York City. This Board, organized by mutual consent of the manufacturers and

of the unions of these industries, has cognizance of the sanitary conditions in the workshops of the allied industries. Similar organizations in other industries might well wield great educational forces, which, coöperatively directed, should play an important part in the campaign for industrial health.

In conclusion it may be said that the need for an intensive campaign for education in industrial hygiene and the avoidance of occupational complaints is an actuality, that agencies already exist by which such educational measures may be put into operation. What is mainly required is coöperation and the making of a beginning.



CANCERS.

L. I. Dublin, New York (*Journal A. M. A.*, Sept. 16, 1916), discusses the question of the increase of cancer at the present day. He remarks on the unreliability of statistics and in explaining the apparent increase of the disease, we must consider the marked improvement in registration in our country in the past fifteen years and the better diagnoses by physicians, resulting from the increase of operations and laboratory examinations. There are already indications that the cancer rate has reached its highest point and that in certain communities it is beginning to decline; but whether or not it is on the increase, the cancer rate is excessively high and is a real menace at the present time. He analyzes the statistics of the Metropolitan Life Insurance Company which represents over 10,000,000 persons and are of especial value on account of their intrinsic accuracy. It has been often said that cancer is a disease of the well-to-do, but if the insurance figures show anything, it is that the industrial classes enjoy no advantages, and he also finds little to justify assertions that have been made that certain races enjoy special or partial immunity. As to the ratio between males and females, he finds about half the cancers of white males affect the stomach or liver, and about 20 per cent. more other parts of the digestive tract, making altogether over 70

per cent. of cancers in males. Among females cancer of the genital organs and cancer of the breast are very prominent. Cancers of the skin are much more numerous in men than in women and the rate is extremely low for colored persons and practically negligible in colored women. In general there is a larger proportion of surgically accessible cases in women than in men. The average age of death from cancer in all forms is about 2½ years less in women than in men. Consideration of the average ages at death is important because they indicate the loss to the community from cancer deaths. At the present time a conservative estimate places the total number of cancer deaths in the United States at 80,000 a year—an aggregate of 1,200,000 years of life. The question, however, is not primarily economic but to allay the suffering and, if possible, extend to the persons of middle life and early old age a few additional years of enjoyment. Two lines of effort are clearly indicated. At the present time the greatest promise of success is held out by the surgeon. The second line of effort lies in investigation of the basic facts of cancer, how it is inherited, its method of dissemination, its causes and the measures for its relief. He reproduces an inquiry blank sent out by the life insurance companies to physicians for information that will assist in carrying out these researches.

ORGANIZED HYGIENE.

METHODS AND RESULTS IN INSTRUCTION IN PERSONAL HYGIENE—THE PROSPECT OF IMPROVING THE EXPECTATION OF LIFE IN MIDDLE AGE.

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A LONG-STANDING criticism on the part of business men, directed against the business college and departments of similar function in universities, is that such institutions teach the adventitious methods rather than the salient problem of business. For instance, work may be offered in banking, in accounting, in business law, in transportation, or what-not—all convenient adjuncts and methods in business. But the nub of business really is "*to know how to make things and sell them at a profit.*" This should be the ultimate result of business training.

In the professional world as well as in the realm of business training too often the emphasis upon method and results is improperly apportioned.

Can it be said that a clear differentiation between means and end has been kept in view in the relation between sanitary and hygienic science and their proposed product—health? Certain methods have been developed by sanitary science, and certain results for health in the bulk have been accomplished by their use. There are certain methods of spreading the knowledge of personal hygiene, and certain results

should be expected for enhanced individual vital preparedness. To what degree has there been clear insistence either in public health work or in instruction in personal hygiene upon results that can be seen, known, and measured?

It would, of course, be supererogatory to review in detail the methods and results of sanitation. The development of a sanitary science is an achievement that needs no heralding. Its results, the increase of the average length of life by reduction of the death-rate at all age periods, are clean cut and constantly in the foreground of the public mind. The reason for its success lies in the phrase, "Sanitary Science." It is a *science* and has progressed by experiment and generalization, and by the expression of its results in quantitative terms.

But to say that sanitation has succeeded in reducing the death-rate at all age periods is not, apparently, strictly true. What can be truly said is that the bulk of its success along its own proper lines has now been achieved.

Where sanitation has apparently failed, as shown by certain interesting and suggestive statistics, has been in

connection with the increasing death-rates between the ages of forty and sixty in this country. This important phenomenon has, of late years, been the subject of keen analysis and discussion. It appears that these are the ages where degradative changes in circulatory and excretory tissue, resulting from careless management of the human mechanism in youth, are likely to culminate. To sanitation, therefore, whose proper sphere has in the past included the prevention of infectious disease, the fault of failing to prevent these "wear-and-tear" diseases cannot be ascribed, except as the latter's etiology may include microorganisms as well as abusive treatment of the human machine. Nevertheless, boards of health, seeing new responsibilities before them, have turned resolutely to the problem of extending their influence to include this enormously difficult proposition of inculcating the principles and habits of personal hygiene among the general population with whom they deal. In other words, in addition to their heretofore customary task of regulating man's parasitic environment, of shielding him from his microscopic enemies, they now undertake to teach him to increase his physical stamina, to strengthen his body defences.

But why should public health agencies feel it incumbent upon them to enter this field of hygiene propaganda in the schools and in other community organizations? Has no other agency, these forty years, been entrusted with the task of developing a physical morale of living, of conducting a

campaign planned to form a junction with the operations of boards of health?

There have been, of course, the schools in which the young idea with its "physical basis" has been supposed to receive instruction and training in vital fortification. Such instruction has, for the most part, been given sometimes by the grade teacher and the teacher of biology in the high school, and sometimes by a special class of teachers of nondescript standing (speaking of the country and the past thirty or forty years by and large) called variously teachers of Physical Culture, Physical Training, Physical Education, "Gym Teachers," etc.

In regard to the quality of instruction given by the regular staff teachers, it would seem needless to add to the existing number of despairing criticisms. Suffice it to say, in summary, that it has in the main been ineffective for three principal reasons. First, it has been too often preaching, instead of teaching. Second, it has usually been unsound. Third, it has been largely hypocritical. It should be added that such criticism should be considered directed, for the most part, for reasons that will appear later, against the "system" and administrative authorities, rather than against the personnel of the teaching force.

What of the special teachers of physical training? Theirs has been the special task, from the nature of the inception of their work, of raising the level of the individual's and so of the nation's vitality. Have they suc-

ceeded? One might say that the striking increase in the death-rate from all causes but especially from organic disease at the middle and later age periods in this country as compared with the decrease in European countries answers the question in the negative. For thirty or forty years the teachers of physical training have been performing their duties in the schools, and the young population coming to maturity has shown increasingly the circulatory and excretory defects which correct personal hygiene and good habits of exercise are supposed to forestall.

Let me hasten to add that this is to be considered a tentative suggestion only, as few would be so rash as to suggest that amid the flux of conditions in a new country (swamping immigration, movements in and out of the registration area, etc.) any one condition can be singled out and taxed with such a failure. This professional group, the teachers of physical training, may by their efforts and in spite of heavy handicaps have ameliorated the failure. There is no way to prove that they have not.

On the other hand, there is nothing to show that they have. They have kept no books,* proposed or made no extensive, sustained health surveys upon which to base their claims for public support. It has remained for vital statisticians to discover the deplorable gap in expectation of life at the half-way age groups, and it has

been the boards of health, insurance companies, social workers, and medical inspectors of schools who have suggested health surveys to record the effects of training in personal hygiene, and to be a practical guide to further development of that work.

Sanitary science has had its up-hill road to travel, its period of small beginnings, obstructions of politics and ignorance to surmount. If influences outside what has been heretofore its accepted field have interfered with attainment of results, it has made it its business to control those influences. Thus it has spread to cover bacteriology, chemistry, entomology, engineering, statistics, education, medicine, and politics. It has made no excuses, but has presented its books for public auditing showing a balance on the credit side.

One cannot, after all, escape the suspicion, based on these much discussed figures for the death-rates at the middle age periods, on the absence of other statistics to show the precise effects of the teaching of hygiene in the schools, and on inexpert observation, that the teachers of hygiene and of physical training have, perhaps, been teaching classes,—not creating health. They may have been engrossed with method, and may not have been “making goods and selling them at a profit”—for the school child. If classroom work, no matter how “perfect” the technique or how “correct” the principle, does not produce the results in increased living and working capacity, then there is no excuse for not so altering it, so extending its correlation with other agencies of health work,

* F. L. Hoffman. “Statistical Evidence of Physical Progress or Deterioration of School Children.” Eighth Congress of the Am. Sch. Hyg. Asso., San Francisco, June, 1915.

so enlarging the influence of personal example that it shall produce recognizable results.

But, it may be said, that hygienic results form only one phase of the work of physical training; that the latter is on a higher pedagogical plane; that it is concerned primarily with properly building the essential elements of action into the child's physical-mental-moral self,—with “fundamental education.”

Such dilatory hair-splitting over definition (“speaking feelingly on the higher aspects”) is merely one of the dead weights which submerge the teacher in method, out of sight of results. The question as to whether hygiene includes education, or education shall swallow hygiene is precisely as important as the question, “which came first, the chicken or the egg.” It matters little whether hygiene be called a phase of education (and the pedagogy of heart, lungs, and liver be injected into the discussion of education in its historic sense, if that seems to anyone to be a suitable and logical classification), or education a phase of hygiene, if results are on record from whichever angle the matter is viewed. It matters less if it turns out that the results in either case overlap, almost to the point of coincidence. What are the desired results of education?

It were a venturesome amateur who should enter glibly into a discussion that began with the beginning of history, has filled libraries, and which approaches its termination as a limit. However, for tentative purposes: education is an evolution of the human being resulting, under given conditions

of inheritance, in a useful, long, and happy life. Hygiene is the material science of organic efficiency that complements education and increases the probability, for the average individual, of usefulness, longevity, and happiness.

There is no desire or intention to monopolize under the title “hygiene” every activity of the profession of physical education that can be coaxed to show even the slightest trace of hygienic squint, nor, on the other hand, to establish a pedantic and unprofitable aloofness of hygiene from the education-hygiene complex. Surely, let there be physical educators with high ideals, and mature and scholarly knowledge of their Mulcaster, Locke, Froebel, and modern educational theory. Let them formulate the special psychology and ethics of gymnastics and play. Let physical education prove the connection in actual fact, as it is doing in certain directions, between the training it gives and the personality of its teachers on the one hand, and on the other hand lives of concrete usefulness in thought and action. But what must be thoroughly deprecated is the tendency to merge with non-scientific, qualitative, philosophic method of education, such things as the “education of the viscera” (*viz.*, personal hygiene) which may be more profitably studied by the method of exact science and the results of which expressed in cold statistics. Education and hygiene are complementary and interpenetrating in aim and ultimate results. But they differ in that the methods and expression of results

of the latter are quantitative and scientific. Such quantitative expression of results the community is coming to demand.

Although sanitarians are alive to their obligations to strengthen human vigor in the middle age periods, it cannot but be observed that as they tackle the problem they are unable to shift their habitual attitude of attention solely to the prevention of disease to an attitude of constructive attention to health. More effective "school hygiene" is their aim, but, scrutinized closely, their "school hygiene" is seen to be a congeries of medical inspection and school sanitation—the book-keeping and janitor service of hygiene. It is not to be denied that medical inspection and school sanitation are in urgent need of improvement and standardized direction at the hands of the only agency that is qualified to improve and direct them—boards of health. But it is an error to suppose that these things constitute the strategic points of the campaign. Accurate and well organized accounts are indispensable as methods in successful business. They are lubricants and ergometers of the business engine but "making goods and selling them at a profit" is the steam in the boiler. Likewise making health by effective teaching and by the development of persistent habits of exercise and diet is the major objective of school hygiene.

Improved medical inspection of schools, school clinics, school sanitation, etc., are sure to come as *modi vivendi* are developed between boards

of education and boards of health. The wind of popularity is blowing in that direction. The papers are full of "decayed teeth," "adenoids," "myopia," and "spinal curvature."

What may come much more tardily and what is essential for the school child's benefit is, first, coöperation between the various agencies that are now working independently for his healthy development, and second, improvement in the quality of instruction in hygiene. It avails little for the self-supporting newsboy to be told to avoid wet feet, not to try to carry loads beyond his strength, to sleep out of doors, to partake only of appetizing food amid pleasant surroundings, and to be serene, if social and economic conditions clearly show the advice to be farcical, and if no follow-up work succeeds the instruction. It avails little if latent or possible foci of infection are sought out by medical inspection, if no effective teaching of personal hygiene accompanies and follows inspection. Instruction in personal hygiene is of negative value if it is not backed up by the personal example of the instructor and if its effects are not checked up and verified in the vital statistics of school and country.

How to accomplish the coöperation between board of health, school administration, social service organization, etc., in respect to this particular problem? This is the type of question, the answer to which, in words, does not exist. But it must be eventually answered in practice, and is so being answered in some communities, in spite of conflicting spheres of admin-

istration. However, past experience in the sharing of authority in medical inspection has been so painful that one hesitates to visualize the situation when school superintendent and health officer "coöperate" in hygienic instruction.

Improvement in the teaching of hygiene is bound up in the question of coöperation. But the ill-advised and hasty entrance of public health authorities into the field is not sure to prove an unmixed blessing. There must be real coöperation: a cordial willingness on the part of public health administrators and educators to learn each other's lines of work and accept each other's judgment in the special field of each. Poor as has been the teaching of personal hygiene, it does not at all follow that matters will be improved by the substitution for the present teaching methods of wholesale hygienic evangelism and other vagaries of medical officers.*

How to accomplish improvement in instruction, long delayed in spite

of frequent criticism? Here again any brief answer may be an "explanation that does not explain." However, this can be said, which has the virtue of obvious truth if not of a complete, practical solution, that the grade teachers and teachers of biology in the high schools should possess sound and uniform teaching material; second, that they should set a creditable hygienic example; and third, that they should have a professional spirit which will seek results, if necessary, through correlated interests and by many means outside their regular teaching routine.

But the limits of the grade and high school teacher in assimilating special subjects are all but reached? There is, then, the special corps of teachers of physical education whose special function is now education by directed activity. Proper habits of activity, in view of modern cheap transportation and the thousand and one substitutes for muscular activity that modern invention seductively offers,

*"The writer has been employing the case system in teaching hygiene and preventive medicine during the past two years in public school work. In using the case system to teach hygiene and preventive medicine, the teacher at the start of the lesson distributes to the pupils records of specific cases of disease and disorders which occur commonly in everyday life. The cases are given out just as they occur in life, *i. e.*, the diagnosis, the prognosis and treatment are not given away but must be thought out by the pupil. The teacher is given a teacher's edition which consists of three things: (I) the subsequent history of the case setting forth the diagnosis, outcome and treatment; (II) a list of objects that the case is designed to accomplish; (III) an outline of practical and scientific facts used to teach the lessons designed to accomplish the objects.

"As an illustration the following case was given out:

"Michael P., aged thirty-two, a motorman, had been working at his occupation about six months when he noticed that the veins in his legs were getting large. In six months more they were very large and there were

more of them. At the end of two years he had masses of large, hard, knotted veins on both legs and up the inside of the thigh. The pain in the veins often kept him awake at night. In speaking to a friend about it, his wife said that he was troubled with 'very coarse veins.' While driving his car through heavy traffic down-town he felt a sharp pain and soon his foot felt wet."

"The pupils were given three minutes to read it over and decide in their own minds the answer to three questions: (I) What is the trouble with the man? (II) What is the outlook for him? (III) What would you do? . . . In a like manner the entire fields of hygiene and preventive medicine are covered. Many of the cases are about the prevention of things in which the child is immediately interested. . . . In this instance, the children in the sixth grade made a diagnosis of hemorrhage and varicose veins without being told."

Quotation from "The Case System of Teaching Hygiene and Preventive Medicine in the Upper Grades." H. W. Haight, *Ed. Rev.*, N. Y., May, 1915.

constitute the chiefest of the three or four chief divisions of the subject of personal hygiene. Therefore, upon these teachers, the responsibility logically rests of creating effective methods of instruction in personal hygiene—instruction which is scientifically sound, which is strengthened instead of nullified by personal example, and which “engages” with the other cogs (school sanitation, medical inspection, etc.) in the machine of organized hygiene.

This is not a new suggestion. It was made twelve years ago by Sedgwick and Hough,* and by Hough,† with an insight and with a convincing power of expression that have not been approached in any subsequent discussion of the subject. That it has not borne fruit is shown by the fact that, of the graduates of one of the normal schools of physical education of high standing, the number called to positions involving the formal teaching of personal hygiene has been during these eleven years only *one per cent.* of the total number of graduates in that time who are now actively engaged in the profession.

That the leaders in the profession of physical education appreciate the situation in theory, is easily seen. Storey says, “The objects of school hygiene and physical education are identical

. . . we believe that this broad field belongs logically to us.” Meylan, “The teaching of hygiene belongs normally to the department of physical education.” Sargent, “Physical training in its best sense is nothing but applied physiology and hygiene.”

What, then, have been the causes for the actual apathy toward Hough and Sedgwick’s proposition. First there has been the demand of school administrators for the traditional type of teacher. Second, the tendency of the normal schools of physical education, many of them privately financed, to supply this demand rather than to venture to create a demand for broader types. Most normal schools, to be sure, have introduced into their curricula courses in “school hygiene” and cognate subjects, specific in name but too often vague in content, sometimes with the intent of really rising to the new situation, sometimes for appearance’s sake. But the weight of relatively unchanging demand has crushed all vitality from such courses, and from the course in personal hygiene, and left them emasculated forms, considered by the students to be devoid of any possibility of application in their future work. The third cause of absence of response to Hough and Sedgwick’s proposal has been the heterogeneity of standards of admission, content of curriculum, and requirements for graduation of normal schools of physical education.

Summarizing thus far and concluding: boards of health are seeking ways of gaining influence over the personal hygiene of individuals; of extending

*Sedgwick, W. T. and Hough, T. “What Training in Physiology and Hygiene May We Reasonably Expect of the Public Schools.” *Science*, N. S., XVIII, 455, Sept. 18, 1903, pp. 353-560.

†Hough, T. “On the Correlation of the Work in Physical Training with Instruction in Personal Hygiene.” An address delivered before the Physical Education Society in Philadelphia, Jan. 24, 1903. Reprinted by the Boston Normal School of Gymnastics, now the Department of Hygiene, Wellesley College.

their work beyond the limits of prevention of infection.* An important fulcrum for getting a purchase on the problem is this hygienic training in the schools and other social and educational organizations. There, most effectively, may the youth and their parents be reached. It is doubtful if health officers in this country, following their traditional bent, will do otherwise than what has already been done, carry sanitation and preventive medicine into the schools and label it "school hygiene." Improvement in school sanitation and school statistics is to be desired and must be secured. But more important is effective *teaching* of personal hygiene. Such teaching should naturally be expected to center in the teachers of physical education. Theirs is now the function of directing the instincts of physical activity into permanent channels, and such direction and regulation of exer-

cise is four fifths of the teaching of personal hygiene.

The organization of teachers of physical education already exists. To improve and use an existing organization is, as Hough and Sedgwick pointed out in connection with this particular situation, axiomatically more economical than creating new machinery for the manufacture of health in the school.† The reorganization of physical education in scope and methods is a problem in itself.

A large majority of teachers of physical education and trained supervisors of school hygiene and sanitation should come from public normal schools, and colleges and universities. No criticism is necessarily implied of the quality of work of institutions now under private control. But it is believed that a stronger, better balanced situation will exist when their work has largely passed under the

* "As medical inspectors we should take a comprehensive view of educational hygiene. It is perhaps true that the amount of detail involved in systematic medical inspection, 'following up,' and treatment tends to mask the larger issues. But while we inspect and treat, we should also think of the means within our power by which we may be able to build up the physique and resistance of all school children.

"It has fallen to the lot of educational authorities to supervise and to some extent to contribute to the physical well-being of all school children. All the factors falling within such an undertaking should be correlated, controlled and directed by the medical officer. It is only reasonable that efforts to detect and cure disease and physical unfitness should be accompanied by efforts to prevent such disease and physical unfitness.

A broad general system of constructive hygiene should form the basis of the entire work of the school medical inspector. It is needful to guard the health of the normal child quite as much as to seek out and remedy the disease of the abnormal child. . . . The child and not the disease should be the main point of interest. . . ."

Mackenzie, W. L. and Cruickshank, L. D. (Eds.) "Problems of School Hygiene, being a rept. of the first conference of Scottish School Medical Officers." Edin. and Lond., Wm. Hodge & Co., 1914.

† " . . . the medical officer will naturally seek out and utilize to the best advantage schemes that aim at improving the physique of all school children. One such scheme already exists in physical training. This subject already forms a part of the curriculum of every school. It is already sufficiently organized to form an excellent basis for the development of a more comprehensive scheme of physical education.

"Physical education is finding its true place in the school curriculum rather slowly. This is perhaps due to some extent to the want of a clear conception of what is aimed at, and of a careful consideration of the means by which the end is to be attained. Personally I feel that until this subject receives from the medical officers the serious attention that it merits, its development as a school subject will be slow and unsatisfactory. . . .

In short, physical education is a largely unexplored field so far as it affects the hygiene of youth, and the time is ripe for a carefully considered series of investigations and experiments on its true place in hygiene education. . . .

"It would be difficult, almost impossible, to efficiently correlate to the extent I have suggested medical inspection and physical education; but I think it must be apparent to those who have given serious thought to the matter that this blending of two mutually dependent branches of work is highly desirable."

Mackenzie and Cruickshank, *loc. cit.*

direction of state boards of education and corporations of colleges.

As has already been suggested, a curriculum may be devised that will give in fact as well as in name the training that will lead to results: in brief outline, as follows:

I. An adequate foundation of science, mathematics, physics, chemistry, and biology, and of modern languages.

II. That great class of material, already carefully elaborated—gymnastics, informal exercise, posture development, the pedagogy and ethics of physical training, special anatomy and physiology.

III. 1. Theory and *practice* of teaching personal hygiene.

2. The principles of bacteriology, immunity, and preventive medicine.

3. Sanitary science.

4. Medical inspection of schools (to make possible assisting in such work).

5. Symptomatology.

6. Vital statistics.

In all courses practical problems should be covered in the laboratory work. There should be sanitary surveys of school establishments, visits to board of health laboratories, practical work in assisting in school medical inspection, exhibits of outfits sent out by public health laboratories, and of the literature, cards of instruction and notification, test charts, blanks, etc., that are distributed to teachers in those states and cities farthest advanced in school medical inspection.

For those who wish to qualify for eventual work of greater responsibilities, there should be courses leading to advanced degrees, in combination or not, with medical training.

The work of this class of teachers would include, first, physical education and instruction in personal hygiene, and supervision of the regular teachers in both regards. Second, owing to their strategic intermediate position between the untrained regular teacher and the trained itinerant health officer, it is specifically fitting that they should coöperate with both in the detection of structural defects and incipient infection, and in overseeing the general sanitary condition of the schools. Their expert training in physiology, hygiene, and sanitation combined with a professional constructive attitude in matters of hygiene can never be duplicated by the school nurse, important as are her duties. The absence of all medical bent is a distinct point in their favor.

Such a nucleus of trained teachers and directors of school hygiene, using the phrase in its best meaning, by teaching methods which are pointedly effective, but broad and coöperative, and by their appreciation of and ability to measure the results they are seeking, should be expected to leaven the whole lump of hygienic instruction in schools and other organizations—Christian Associations, Boy Scouts, clubs and societies of older men and women, and the military training camps of the near future. It should be an integral driving part in the new machine of *organized hygiene*—a machine whose specific manufactured product is to be improvement in the expectation of life and increase in working capacity at the middle age periods.

Such a broadening and deepening of the function of the teacher of physi-

cal education cannot be expected from the normal schools unassisted. They have heard the call, these twelve years or more, and have been unable to respond in practice for reasons already mentioned. When a demand comes from a school administration handling twenty thousand children, for three teachers of physical education to supervise the work of five hundred teachers in gymnastics and dancing, teachers must be furnished who are intensively qualified to drive through so much routine under high pressure. It is not practicable, before the education of school administrators has reached a more enlightened level, for the normal school to press the alternative on the employers who apply to them, of hir-

ing several times that number of teachers of *hygiene* who can supervise the gymnastics, and play, but who are also broadly qualified to teach and to supervise the teaching of personal hygiene and to assist in medical inspection and school sanitation. When the broader demand comes, the normal schools will be able and eager to meet it. To create such a demand in the mind of the educational system is an obligation upon public health officers and physical educators. To insist that graduates of normal schools of physical education be qualified to carry their full share in the coöperative work in hygiene of the future is the duty, if the plan is a sound one, of public health officers and educators.



PLAYING TO THE GRAND STAND.

"Grandstander" is a term of more than mild reproach used to characterize the athlete who plays his game in showy fashion with an eye to the plaudits of the onlooking multitude. In football, he is always limping after a tackle; in baseball, he is excessively active, making unnecessary motions and attempting to cover ground he was never meant to cover; in golf, he adjusts his tee with a nicety which can have no effect on the distance of his drive, and if he "slices," the "gallery" is indulged with an exceedingly technical discussion of just how it happened. No one is so inclined to "grandstand" as the American officeholder or public official. The medical aspects of the matter are being displayed in the present epidemic of infantile paralysis. The measures employed by some officials to stay the progress of the epidemic, while apparently logical in every instance, at times impress the average observer as being

merely an attempt to play to the grandstand. In some communities the health officers appear daily in interviews in which they call attention to their immense activities in preventing the spread of the disease. Every move is chronicled in the newspapers, and press notices are sent to those papers which fail to interview the official personally. Commissions are appointed to investigate when there are no funds for such purposes, and in some instances when there are not enough cases to form a respectable basis for an investigation. Frequently a "grandstander" in athletics is rewarded merely by the hisses of those whose encomiums he seeks. It would not be strange if a similar fate should befall some of those public officials who carry the unsportsmanlike attitude of the "grandstander" into the care of the public's health. —*Journal of the American Medical Association*.

A STUDY OF METHODS FOR DETERMINING AIR DUSTINESS.

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An Investigation Conducted under the Joint Direction of The New York State Commission on Ventilation, The American Museum of Natural History, and The American Museum of Safety. 1915-1916.

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INTRODUCTORY.

THE excessive prevalence of tuberculosis and other respiratory affections among the workers in dusty trades is amply demonstrated by statistical data. In order to obtain a clearer understanding of the amounts of aerial dust that are harmful and hence help to allay the dangers of dusty occupations through the medium of regulations bearing on personal hygiene and protective devices, it is essential to study by analytical methods the dust content of the atmosphere. Numerous procedures have at various times been proposed but the very diversity of these methods has made the comparison and the interpretation of analytical results most perplexing. Furthermore some procedures are very limited in their application. It has been the purpose of the present study to inquire into the merits of certain of the most promising methods with the idea of selecting one which can be recommended as a standard method for ordinary ventilation investigations.

METHODS THAT HAVE BEEN USED FOR DUST DETERMINATION.

Without entering into too great detail there may be listed here some of

the dust analysis methods which have at one time or another been followed:

1. Exposing oiled plates to the air for a definite time, washing the plates with oil and comparing the color with dust and oil standards. This method is mainly applicable to soot and smoke (Liefmann) (1).

2. Revolving a syrup covered paddle wheel in the air and noting the resulting discoloration of the white blades.

3. Drawing a measured amount of air into a small chamber and rarifying the medium thus causing a deposit of moisture on each dust particle present. The intensity of the fog created is then compared with translucent glass standards (the Koniscope-Aitken) (2).

4. A modification of the Koniscope; the dust particles in this case being caught on a glass slide and the moisture droplets counted (Dust Counter-Aitken) (3).

5. Passing a measured amount of air through a cylinder in which is inserted a shallow dish, coated with glycerin. As the air stream is propelled against the dish, the heavier dust particles are caught on the glycerine, the air and lighter particles passing on around the edge of the dish.

The particles on the plate are counted with the aid of a microscope (Graham-Rogers) (4).

6. Suspending a container of water in the air for several weeks and then weighing the accumulated dry solids after filtration. This method was used to determine the prevalence of dust in different sections of a city (Whipple and Whipple) (5).

7. Filtering a measured amount of air through paper, mixing the residue with oil and comparing the color with dust and oil standards. This method was used for the determination of soot (Rubner) (1).

8. Filtering a measured amount of air through cloth and comparing the discoloration with a set of cloth standards (Todd) (6).

9. Filtering a measured amount of air through collodion wool, dissolving the wool in ether and counting the particles in a small quantity of the liquid (Hahn) (1).

10. Filtering a measured amount of air through sugar or resorcin, dissolving in water and counting the particles in a small portion of the sample (Winslow & Baskerville (7), Lanza (8)).

11. Filtering a measured amount of air through fine mesh wire cloth with subsequent bubbling through water and then determining the weight of the solids collected. This method was used for determining the dust in flue gas (Klein) (9).

12. Filtering a measured amount of air through cotton wool and noting the increase in weight (Duckering (10), Ditman (11)).

13. Filtering a measured volume of

air through Soxhlet paper thimble and noting increase in weight (Mariner and Hoskins) (12).

In addition it is also of interest to mention several devices which have been constructed involving in some cases certain principles which do not appear in the foregoing list.

One of these is a centrifuge which Wells of the U. S. Hygienic Laboratory used with some success in sampling bacteria. The whirling of a cylinder with extended tubular arms on a vertical axis causes a current of air to pass down an aperture at the axis into a glass tube whose walls are lined with agar or gelatin, and thence to pass up and out through the tubular vanes. The centrifugal action and the lessened velocity through the glass tube causes the suspended matter to precipitate against the walls. The subsequent incubation of the tube permits a growth of colonies where the individual bacteria have alighted and these colonies are readily counted with the naked eye.

A modified form of the above device involving the centrifugal principle but with greater air capacity was devised for the Commission by Wallace & Tiernan, of New York City. This apparatus had a metal bowl of eight inches diameter and 6 inches in height whirled by a direct connected motor mounted on a vertical shaft. The entire equipment weighed 38 pounds. So many difficulties developed in the use of this apparatus such as the varying motor speed, the difficulty of removing the dust from the interior of the bowl, together with its general cumbersomeness, that further

experimentation with it was not deemed expedient.

The precipitation of dust from flue gas onto a high tension pole has proved useful on a practical scale. A potential of 40,000 volts is necessary for

ing of the luminous particles seen at right angles to the light beam was given some little attention by one of us (Coleman) but the difficulty of preparing standards for comparison and the elaborateness of this procedure discouraged continued effort.



SUGAR FILTER WITH WALLACE & TIERNAN AIR PUMP.

this action. The application of this principle to the sampling of small quantities of dust has been the object of some study by Doctor Macmillan of the New York City Health Department.

The luminosity of dust particles in a strong beam of light is familiar to every one. The authors endeavored to construct a device which would permit the direct counting of the particles on a light beam but this did not prove successful. An extension of this idea involving the photograp-

DISCUSSION OF THE PRINCIPLES OF DUST DETERMINATION.

It is impossible in the short space of this paper to enumerate the advantages and shortcomings of each of the procedures which have been described. It will be sufficient to touch briefly upon the underlying principles of sampling and estimation involved.

The determination of the dust content of air consists of two steps (1) sampling and (2) measuring the quantity of dust in the sample. The methods cited may be classified readily under two main processes of sampling, viz., precipitation and filtration. The measures to be employed once the sample is collected include (1) noting the cloudiness of the sample, or the turbidity if suspended in a liquid, or noting the color or discoloration of a dry filter pad; (2) weighing the mass; (3) counting the particles in an aliquot portion of the sample.

1. *Sampling by Precipitation.*

Sampling by centrifugal and electrical precipitation has not been sufficiently developed to receive comment. Precipitation by gravity as illustrated by Method No. 6 proved very successful for the particular study before the Whipples, but the long time necessary to secure a weighable sample renders this method un-

suitable for ordinary building inspection work.

Precipitation, as illustrated by the Graham-Rogers plate, collects but the larger dust particles, and as it is these larger particles which are probably more dangerous to the mucous membrane the originator of this method believes that what is apparently a weakness in this method is really an advantage. With this sampling method, however, the estimation of the quantity of dust is limited to counting.

Precipitation of moisture on the dust particles by rarification of the air, a principle developed by Doctor Aitken in the Koniscope and the Dust Counter, may be criticized because of the smallness of the sample measured. Further objection is found in the subsequent methods of measurement. The fog of the Koniscope is difficult to standardize in absolute units and the size of the dust particles is entirely lost sight of in the dust counter for each infinitesimal particle collects its moisture droplet and is thus given equal weight with the large particles in the resulting count.

2. *Sampling by Filtration.*

Filtration is as a rule a slow process depending, of course, on the fineness of the filter. The smaller the mesh the greater is the resistance to the air flow and hence the longer must be the sampling time. The coarser the mesh, however, the less is the efficiency of the dust removal. It is in the proper balancing of these two factors that the success of any filtration method must rest.



GRAHAM-ROGERS PLATE.

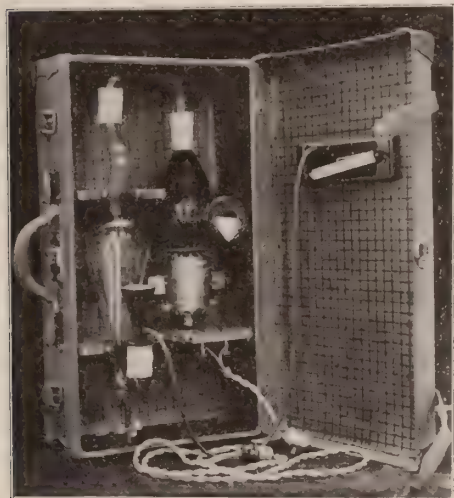
The dish, shown in the hand, rests on the support within the glass cylinder during the taking of a sample. Air entering the cylinder through a small hole in the stopper, is drawn down past the edge of the plate and leaves the cylinder through a glass tube at the bottom.

The wire mesh screen is suitable only where great quantities of dust are present as in garbage reductor stacks. The cloth filter collects only the larger particles of dust and this amount must be estimated by discoloration rather than by weighing. Those particles whose color is most sharply contrasted with that of the filter may influence the final result much more than particles whose mass may be greater but whose color is less conspicuous.

The heavier paper pad is more efficient in removing dust but its lesser porosity cuts down the rate of sampling. The weighing of a sample collected by this means is interfered with by the excess moisture in the filter itself. The actual weight of dust is determined only after tedious

drying of the filter to constant weight before and after sampling.

The soluble filtering media-collodion wool, sugar, resorcin are used usually in conjunction with subsequent estima-



WATER SPRAY SAMPLER.

Showing air pump and glass sampling bulb, air measuring tube over inlet and indicating manometer.

tion by counting. In addition to the limitation upon the size of the sample imposed by the resistance of an insoluble pad there is also associated with this method an error due to the inevitable dust content of the filtering material itself. The size of this error is not easy to estimate and hence it is difficult to make accurate allowance for in the total dust count.

The use of water as a filtering medium is a slow process if the air is drawn through in bubbles, and, unless the bubbles are small, dust is apt to be entrained and pass through untouched. When, however, air is passed through a spray or curtain of water, high efficiency is possible with very little

resistance. Furthermore, by sampling large volumes of air in this manner it is possible to determine the weight of dust as well as the count and turbidity.

This last procedure has received very thorough investigation by the authors and was described by one of us (Palmer) at length in the issue of the *AMERICAN JOURNAL OF PUBLIC HEALTH* for February 1915 (14).

THE MEASURING OF DUST.

When the dust content is observed directly as in the beam of light the sampling process is eliminated. Shortening the procedure in this manner is a point in its favor but very little has been done along this line.

Estimating the dust content in a sample by the *color* or *discoloration* produced is much the simplest method of estimation once the standards are prepared but this method is very limited in its application and is open to grave objections as already mentioned. It is impossible in this way to compare amounts of dust unless their color and texture are identical. This colorimetric method is peculiarly suitable for the determination of soot and smoke, but it is not suitable in comparing amounts of dust from different factory processes. Again, the preparation of the standards is not a simple task for there should be a separate set of standards made up from each type of dust to be measured.

Weighing is a more exact procedure but the extreme lightness of dust makes it imperative to sample large volumes of air in order to yield a weight of dust that is within the sensitiveness of the ordinary laboratory balance. Weight,

however, merely gives a picture of the entire mass. It fails to tell us anything of the size of the dust particles, information which is of no little value when comparing different types of dust.

Counting with the aid of the microscope permits, as does weighing, the expression of the result in absolute units. Counting, however, is a laborious and often a gravely inaccurate procedure. It is sometimes very difficult indeed to discriminate between a dust particle and irregularities in the glass slides. As the number of dust particles floating about is very great even in air which may seem exceptionally clean, it is only possible to count the dust in a very small portion of the sample. The amount in the whole sample is then obtained by a conversion factor. If this conversion factor is large then errors in the count are magnified. Because of the difficulty then in counting accurately and in making an accurate allowance for the constant error of dust in the filter and on the slide, it is essential to make the conversion factor as small as possible and this is best done by making relatively large the volume of air sampled.

The number of particles in the field also influences the accuracy of the count. A sample with relatively few particles, less than 10 per quarter field, will be counted with greater accuracy than a sample having several hundred to a quarter field.

The count by itself tells but one story of dustiness as does weight by itself. Both are needed for the interpretation of air dustiness. The

fine lint floating in a carpeted room would have a high count but would weigh little. In direct contrast is an atmosphere laden with marble dust. Here the count would be relatively much smaller than the weight.

PART I.

METHODS SELECTED FOR STUDY.

After considerable preliminary experimenting guided in a large measure by the recommendations of the Committee on Standard Methods of Air Analysis of the American Public Health Association as described in the report for 1912 (4), it was decided to make a direct comparison of three sampling methods which seemed to possess certain distinct advantages over other methods. The three in question included the sugar filter operated in conjunction with the Wallace & Tiernan pump; the Graham-Rogers plate, also operated with the above mentioned air pump; and the water spray filtration apparatus (see photographs).

Technique.

The procedure consisted in setting up the three types of apparatus side by side and collecting air samples at approximately the same time. This plan was the fairest that could be arranged but it must be borne in mind that even under these conditions the air sampled by each machine was, of course, not identical. The opening of a door or a window or the passing about of people would at times give rise to air currents which in the opinion of the observers caused some

variation in the dust content of the air drawn into the different machines. Furthermore the sampling time for the first two methods was 12 minutes, three cubic feet being pumped. As but one pump was available, these methods could not be operated simultaneously, but had to be taken in turn. The water spray sampler passed 3 cubic feet in 1 minute.

Attention is drawn to these various possibilities for legitimate difference in the final result not so much to excuse the irregularities that occur as to make it clear to the reader that the accurate sampling of air is a difficult matter. It is quite another thing from the sampling of water for a bacterial count, for water is much more homogeneous than air and the distribution of suspended matter and chemical constituents is much more uniform.

The sampling places included a hat fur factory, a burlap-bag factory, a rag sorting shop and a pearl button factory. The dustiness of these places of course varies from day to day and from hour to hour depending on the particular work then in progress.

The ordinary routine consisted in devoting the mornings to sampling and then returning the samples to the laboratory and carrying on the analysis there in the afternoon.

Owing to the limitations of two of the methods the comparative efficiency of these devices was to be based on the resulting count per cubic foot of air sampled.

The Graham-Rogers plate was counted directly under the microscope, the $\frac{2}{3}$ objective being used. Ten

representative areas of equal size were counted and the average was multiplied by the number of such areas on the plate. The total count for the sample thus obtained was converted into the count per cubic foot of air.

The standard procedure was followed for each of the other two methods, $\frac{1}{4}$ field or 0.25 sq. mm. being the area examined. In counting, five sizes of particles were distinguished, viz:

1. Large masses about 100 standard units (.04 sq. mm.).
2. About 25 standard units (.01 sq. mm.).
3. About 1 standard unit (.0004 sq. mm.).
4. About $\frac{1}{4}$ standard unit (.0001 sq. mm.).
5. Dust too fine to count but whose presence is noted by a + mark.

This scale may seem somewhat arbitrary and unevenly graded, but its selection was based on some preliminary counting which showed that these divisions provided a convenient grouping for the eye and that more refined or evenly graded areas could not be readily recognized.

Analytical Data.

In Table I is presented among other data, a list of the samples collected, the amount of air sampled, the time of sampling, the average of 10 counts for each size particle per $\frac{1}{4}$ field, the actual average count per cubic foot of each size and the total count per cubic foot.

Eighteen samples were collected with the sugar filter, 21 with the water spray filter and 8 with the Graham-Rogers plate.

TABLE I.

Place.	Date.	Sampler.	Cu. ft. air sample.	Time minutes.	Av. of 10 counts per 1/4 field (sizes.)					Av. No. particles per cu. ft. of air by sizes.				Total count per cu. ft.	Dustiness.	Dil. water C.C.	Comments.	
					1.	2.	3.	4.	5.	1.	2.	3.	4.					
Hat fur.....	Aug.	9 Sugar	Average % of total count	3	0	0	6	43	1	+	0	0	12,000	862,000	V.D.	15	8,670 hair particles per cu. ft.	
				3	0	0	1	5	38	1	+	0	0	30,000	792,000	V.D.		15
				3	0	0	2	51	4	+	0	0	4,000	1,030,000	V.D.	15		
		Spray	Average % of total count	3	0	0	0	0	0	0	0	0	15,300	883,000			Hair in bottle but not on slide	
				15	0	0	1	18	7	+	0	0	2,400	454,000				
				9	0	0	4	21	2	+	0	0	16,000	848,000	V.D.	90		
		Plate	Average % of total count	12	0	0	0	0	0	0	0	0	9,200	651,000		90	No hair	
				4	0	0	0	0	0	0	0	2	98					
				3	0	0	6	1	9	-	0	0	1,650	4,580	V.D.			
		Plate (Gravity)	% of total count	12	0	0	3	1	4	-	0	0	26	74			No hair	
12	0			0	0	0	0	0	0	823	3,380	V.D.						
6	0			0	0	16	9	+	0	0	20	80						
Burlap bag	Aug.	10 Spray	% of total count	18	0	0	0	0	16	9	+	0	0	676,000	V.D.	90	4,000 hair particles per cu. ft.	
				3	0	2	0	1	7	-	0	482	0	4,580				
				3	1	2	1	7	31	2	2,000	4,000	34,000	664,000	D.	15		
		Spray	Average % of total count	3	0	0	0	5	19	0	1,000	2,000	22,000	502,000		15		
				3	0	0	8	10	0	0	0	25,000	320,000					
				20	0	0	4	8	1	-	0	7,200	146,000	D.	90			
		Plate	Average % of total count	16	0	0	0	4	10	6	0	8,000	212,000		90			
				3	0	0	0	0	0	0	0	13,600	226,000					
				5	0	0	0	0	0	0	6	94	240,000					
		Plate	Average % of total count	3	0	1	2	1	4	-	0	241	482	3,380				
3	0			0	2	7	-	0	0	482	1,690							
3	0			0	1	1	2	-	0	241	2,890							
Plate	Average % of total count	3	0	1	0	0	9	-	60	60	301	2,530						
		3	0	0	0	0	0	0	3	3	10	83						
		12	0	0	1	5	51	4	+	0	30,000	1,030,000	D.	15				
Aug. 13	Sugar	Average % of total count	3	0	0	0	5	47	0	+	0	10,000	950,000		15			
			3	0	0	0	2	37	0	+	0	4,000	744,000		15			
			3	0	0	0	0	0	0	0	14,700	903,000		15				

Rag sorting	Aug. 19	Spray	18 18 18 Average % of total count	6 6 6 6	0 0 0 0	0 0 0 0	3 75 0 1 699 3 5 52 5	+	0 0 0 0	0 0 0 0	6,000 32,000 10,000 16,000	1,500,000 2,020,000 1,050,000 1,510,000	D.	90 90 90		
		Plate	3 3 3 Average % of total count	12 12 12 12	0 0 0 0	0 0 0 0	3 6 9 3 7 6 3 6 1	-	0 0 0 0	0 0 0 0	724 724 724 724	16,600 18,300 14,700 16,600	D.			
		Sugar	6 6 6 Average % of total count	24 24 24 24	0 0 0 0	2 0 1 0	1 0 40 3 1 9 52 5 6 47 9	+	0 0 0 0	1,330 666 666 888	6,670 6,000 4,000 5,560	269,000 350,000 319,000 313,000	N.D.	10 10 10		
		Spray	60 60 60 Average % of total count	20 20 20 20	0 0 0 0	0 0 0 0	6 14 6 1 1 14 8 1 2 12 2	-	0 0 0 0	0 0 0 0	3,600 6,600 7,200 5,800	87,600 88,800 74,200 83,500	N.D.	90 90 90		
		Sugar	6 6 6 Average % of total count	24 24 24 24	0 0 0 0	1 0 1 0	7 20 9 5 12 7 1 5 44 8	+	0 0 0 0	1,000 5,000 1,000 666	7,000 2,400 15,000 9,000	209,000 132,000 448,000 261,000	N.D.	15 15 15		
		Spray	60 60 60 Average % of total count	20 20 20 20	0 0 0 0	0 0 0 0	1 0 15 3 4 23 8 4 21 0	+	0 600 0	0 0 0	6,000 2,400 6,000	91,800 143,000 126,000	N.D.	90 90 90		
		Sugar	6 6 6 Average % of total count	24 24 24 24	0 0 0 0	0 0 1 0	8 27 1 5 24 6	-	0 0 0	0 1,000 500	8,000 5,000 6,500	279,000 246,000 259,000	D.	15 15		
		Spray	36 36 36 Average % of total count	12 12 12 12	0 0 0 0	2 0 0	7 10 4 5 8 9	-	0 0 0	2,000 1,000 0	7,000 5,000 6,000	104,000 89,000 96,500	D.	90 90		
		Sugar	6 6 6 Average % of total count	24 24 24 24	0 0 0 0	1 0 0	8 33 1	+	0 0 0	1,000 8,000 2,7	8,000 331,000 97	340,000	D.	15		
		Spray	36 36 36 Average % of total count	12 12 12 12	0 0 0 0	1 0 0	2 13 1 5 33 6 6 25 0	+	0 0 0	1,000 1,000 0	2,000 5,000 9,000	431,000 336,000 256,000		90 90 90		
					36 Average % of total count	12	0	0	9 33 8	+	0	500	5,500	338,000 339,000		90

Explanation of letters in "Dustiness" Column (Observer's Comment): N.D. = Not Dusty. D. = Dusty. V.D. = Very Dusty.

A scrutiny of this table reveals several interesting facts, namely: (1) the counts with the Graham-Rogers plate are very much lower than those from the other two samplers; (2) the bulk of the particles belong to Class 4; (3) the counts with the sugar filter are usually greater than with the water spray sampler; (4) the amount of air sampled is universally greater with the water spray sampler than with the other two methods.

In order to obtain a true measure of the relative efficiency of these three sampling methods there have been selected in Table II those records from

the sugar filter and the spray sampler which are justly comparable—samples that have been taken at approximately the same time and in the same place. In 5 out of 7 instances the average count for the sugar filter is higher than for the water spray apparatus. Expressing the different averages as ratios, the sugar filter count being valued as 100, the average of the water spray counts is 71 per cent. (see Table II).

Selecting those figures where direct comparison is possible between the water spray apparatus and the Graham-Rogers plate as in Table III,

TABLE II.

COMPARISON OF AVERAGE COUNTS WITH SUGAR FILTER AND WATER SPRAY METHOD OF SAMPLING.

Place.	Date.	Sampler.	Av. cu. ft. Air sample.	Av. count. per $\frac{1}{4}$ field.	Av. count per cu. ft.	Ratio with sugar at 100%.	
						Sugar.	Spray.
Hat fur	Aug. 9	Sugar	3	45.0	907,000	100	
		Spray	12	20.2	660,000		73
Burlap	Aug. 12	Sugar	3	26.4	527,000	100	
		Spray	16	12.1	240,000		45
Rag	Aug. 13	Sugar	3	45.9	917,000	100	
		Spray	18	76.4	1,530,000		167
	Aug. 19	Sugar	6	47.9	319,000	100	
		Spray	60	14.8	89,300		28
	Aug. 20	Sugar	6	27.1	271,000	100	
		Spray	60	20.7	124,000		46
Pearl	Aug. 25	Sugar	6	26.6	266,000	100	
		Spray	36	10.4	104,000		39
	Aug. 27	Sugar	6	34.0	340,000	100	
		Spray	36	34.5	345,000		101
Av.						100%	71%

Av. cu. ft. air sampled Sugar, 5; Spray, 34.

TABLE III.

COMPARATIVE COUNTS WITH THE WATER SPRAY SAMPLER AND THE GRAHAM-ROGERS PLATE.

Place.	Date.	Sampler.	Count per cubic foot by sizes.				Total.
			1.	2.	3.	4.	
Hat fur	Aug. 9	Spray	0	0	9,200	651,000	660,000
		Plate	0	0	1,650	4,580	6,230
		Ratio	0	0	18.0%	0.7%	1.0%
		Spray	0	0	0	676,000	676,000
		Plate	0	482	0	4,100	4,580
		Ratio	0	+	0	0.6%	0.7%
Burlap bag	Aug. 12	Spray	0	0	13,600	226,000	240,000
		Plate	60	60	301	2,530	3,050
		Ratio	+	+	2.2%	1.1%	1.2%
	Aug. 13	Spray	0	0	16,000	1,510,000	1,530,000
		Plate	0	0	724	16,600	17,300
		Ratio	0	0	4.5%	1.1%	1.1%

it will be seen that the counts from the latter represent just 1 per cent. of those from the former. The line marked "Ratio" is a percentage expression of the Plate Count divided by the Spray Count.

On the microscopic count basis, therefore, the proportionate rating of the three types of samplers with the sugar filter at 100 is 71 per cent. for the water spray and 0.7 per cent. for the Graham-Rogers plate.

Selective Action of the Plate Method.

From Table III it is seen that while dust particles of all sizes escape the plate there is some selective action, more smaller particles being lost than large. This finding bears out in a way what the originator of the method

first claimed—namely, that the plate count emphasizes rather the larger particles in direct contrast to the Koniscope which gives undue weight to the minute particles.

But even though the proportion of the smaller size particles is relatively less in the plate method yet in actual numbers this smallest group, Class 4, makes up over 70 per cent. of the total plate count. Hence the least efficiency occurs in the group with the highest count and consequently any conclusions formed from comparative counts made with this method must be very carefully framed.

It is believed that fluctuations in rate of air flow past the plate, in temperature and humidity would have much greater influence in deter-

mining the count in this than in the other two methods.

On one occasion, August 9 (see Table I), the natural gravitation of particles to a plate exposed for the same length of time that it took to collect a 3 cubic foot sample with the air pump gave a count 65 per cent. of that with the pump sample.

The distribution of particles by sizes for each of the three methods is pictured in Table IV, which is a summary of the percentages presented in Table I.

TABLE IV.
PERCENTAGE DISTRIBUTION OF PARTICLES BY SIZES.

Method.	Sizes.			
	1.	2.	3.	4.
Sugar.....	0	0.2	2.8	97
Spray.....	0	0.2	2.8	97
Plate.....	1	4	10	85

From this it is seen that whereas the plate method introduces the selective action spoken of there is no difference in this respect between the other two methods.

Effect of Size of Sample on Accuracy of Count.

If then we should conclude our case on the basis of the foregoing figures it would appear that the Graham-Rogers plate lets 99 per cent. of the dust slip by and that the water spray filter is not anywhere nearly as reliable as the sugar filter. A further analysis, however, is illuminating.

Attention has already been called to the relatively much larger air sample collected with the water spray apparatus. That the size of the sample had a disproportionate influence on the count was felt by the authors in the early part of this work and this belief was later verified.

Samples of varying amount were accordingly taken in the same environment using each sampling method in turn. The influence of the volume of the sample on the resulting count is shown strikingly in Table V. The smaller the sample the greater is the resulting count per cubic foot.

To account for this peculiar result let us review the methods of sampling and the calculations involved in each of these methods to convert the microscopic count into particles per cubic foot.

In the sugar filter method, the sugar and its contained dust is emptied into a test tube, the adapter rinsed with distilled water into the test tube and the water made up to 10 to 15 cc. to act as a solvent for the sugar. From this test tube, which is well shaken, one cubic centimeter is transferred with a pipette to a Sedgwick-Rafter cell. This cell, whose dimensions are 50 mm. by 20 mm. by 1 mm. deep, is then placed under the microscope and moved about so that 10 representative areas each $\frac{1}{4}$ field or 0.25 sq. mm. in size are counted. The area is measured off by the micrometer in the eyepiece and the average count of 10 such areas is the figure appearing in the columns of Table I. No allowance was made for the dust in the sugar as several examinations at the

TABLE V.

Cubic feet of air sampled. Counts per $\frac{1}{4}$ field. Total particles per cubic foot.

(Samples taken with Sugar Filter in a Burlap Bag Factory on August 16.)

.25	29.2	7,010,000
1.25	151.0	7,220,000
3.75	229.0	3,670,000
7.5	330.0	1,840,000
15.0	336.0	1,340,000

(Samples taken with Graham-Rogers Plate in the same place on August 17.)

.33	5.7	124,000
1.7	10.1	43,900
5.0	9.6	13,900
10.0	33.3	24,100
20.0	37.4	13,500

(Samples taken with the Spray Filter in the same industry on August 17.)

3.0	6.5	780,000
15.0	11.4	274,000
45.0	16.8	134,000
90.0	39.0	156,000
180.0	59.0	118,000

(Samples taken with the Spray Filter in a downtown office on October 27.)

2.5	23.5	4,400,000
17.5	24.8	662,000
45.0	25.5	265,000
90.0	28.7	122,000
180.0	78.1	181,000
240.0	76.6	134,000

beginning of this work had shown this to average less than 1 per $\frac{1}{4}$ field.

In the case of the water spray apparatus 40 cc. of water are placed in the bulb and the loss by evaporation is made up from time to time in order to keep the air flow constant. After sampling, this water with suspended dust is drained into a bottle and the bulb is rinsed several times with distilled water. The final volume of water is then made up to 90 or 100 cc. One cc. of this sample is then transferred to the Sedgwick-Rafter cell and counted in the usual manner.

The Graham-Rogers plate is smeared with a thin film of glycerine to retain the dust particles hurled against

it. This plate is counted directly under the microscope.

To convert these counts in the area marked off by the micrometer eyepiece into particles per cubic foot of air, it is necessary to know the volume of the liquid sample and the quantity of air sampled. There is, of course, no allowance to be made for water volume with the plate sampler.

Thus to take the figures in Class 4 in the first sample for the sugar filter on August 9 (see Table I) the conversion formula appears as follows:

$$\frac{43.1 \times 4 \times 1,000 \times 15}{3} = 43.1 \times 20,000 = 862,000 \text{ particles per cu. ft.}$$

where 43.1 is the count per $\frac{1}{4}$ field (0.25 sq. mm.), 4 the conversion factor to sq. mm. as seen through the microscope (the cell being 1 mm. deep), or to cubic millimeters of sample examined, 1,000 the conversion factor to cubic centimeters, 15 the cubic centimeters of the dilution water and 3 the cubic feet of the air sample.

The corresponding calculation in the spray count for that day is:

$$\frac{18.7 \times 4 \times 1,000 \times 90}{15} = 18.7 \times 24,000 = 454,000 \text{ particles per cu. ft.}$$

The corresponding plate count is computed as follows:

$$\frac{1.9 \times 4 \times 1,810}{3} = 1.9 \times 2,413 = 4,580$$

particles per cu. ft., where 1,810 is the number of times the area counted goes into the entire area of the plate.

To illustrate further how the constant error due to any or all of the following causes—dust in the sugar or distilled water, dust on the glass cover slip, on the lens of the microscope, imperfections in the glass slide or cover slip, which look like dust particles—may affect the resulting count, let us refer to the calculations for the sugar filter. If there were no constant error, or no dust particles included in the count except those actually a part of the sample, then the count of 862,000 is correct. If, on the other hand, there was a constant error of 10 particles per $\frac{1}{4}$ field the actual count would be 43.1 minus 10 or 33.1. The corresponding total count per cubic foot would in this instance amount to 662,000 particles.

The accuracy of the resulting count then rests largely in the correct estimation of the constant error and it is not possible to make this estimate with any degree of assurance. In the early part of our work we found as was stated that control counts on dissolved sugar were less than one per $\frac{1}{4}$ field. Subsequent control counts throughout the progress of this study have been as high as 30 per $\frac{1}{4}$ field and have averaged between 10 and 15. Being unable then to correctly estimate the error it is only possible to increase the accuracy of the count by minimizing the effect of this error. This can be done by sampling larger volumes of air so that the number of particles appearing in a $\frac{1}{4}$ field is correspondingly greater.

Thus if the quarter field count in one instance is 15 the resulting count

$$\text{is } \frac{15 \times 4 \times 1,000 \times 15}{3} = 300,000.$$

The constant error we have found lies somewhere between 0 and 30. If it is zero then the above count is correct. If the error is 15 then the actual count would be zero.

Now if by increasing the volume of air sampled ten times the quarter field count is 150 and we subtract the maximum constant error of 30 we get 120 as the corrected figure. Uncorrected the resulting total count is

$$\frac{150 \times 4 \times 1,000 \times 15}{30} = 300,000.$$

With the corrected figure, 120, the corresponding total count is 240,000.

In the first instance there is a possibility for an error of 100 per cent. In

the second case the maximum error possible is but 20 per cent.

With the magnitude of the constant error in mind it is apparent that the efficiency of different sampling methods cannot be accurately judged unless the quarter field counts are nearer 100 than they are 10. Referring back to Table I, it will be noted that there are then only two opportunities for comparing the sugar filter and the spray sample on this basis—namely on August 13 and August 27. On both of these occasions the efficiency of the spray filter compares most favorably with the sugar filter, the average counts on the first date being 1,530,000 for the spray and 917,000 for the sugar, and on the second date, 345,000 for the spray and 340,000 for the sugar.

Summary of Results with the Three Sampling Methods Studied.

To summarize then the results of the foregoing experiments it is felt by the authors that:

1. The Graham-Rogers plate method is too inefficient as a dust sampling method to give results with different types of dust that are at all comparable.

2. The Water Spray apparatus is as efficient for practical purposes as the sugar filter.

3. The Water Spray apparatus is superior to the sugar filter in—

- (a) Making possible the collection of larger air samples in the same period of time with the attendant greater accuracy in the count;

- (b) Providing a sample whose dust content can be estimated by turbidity and weight as well as by counting;

- (c) Being somewhat more portable

(the spray sampler mounted in an ordinary suitcase weighing 17 pounds, whereas the sugar filter used in conjunction with the Wallace & Tiernan pump weighs 23 pounds);

- (d) Simplifying and reducing the errors of technique in the substitution of distilled water as the filtering medium for solid soluble material such as sugar or resorcin whose dust content is a more variable factor.

PART II.

EXTENDED STUDY OF THE WATER SPRAY APPARATUS AS A PRACTICAL SAMPLER FOR DUST ANALYSIS WORK.

Armed with the data gathered from this preliminary study it was now proposed to determine the general usefulness of the water spray apparatus. The analysis of the sample was to include estimation by the microscopic count, weighing the solids after filtration through a Gooch crucible and reading the turbidity of the liquid against known standards.

Estimation of Dust by Turbidity of a Water Sample.

The analytical routine consisted first in transferring the sample, 90 cc. in volume, to a 125 cc. round glass-stoppered bottle. The turbidity was first measured by holding this bottle up to the light alongside of one of the standard bottles and identifying it with the nearest standard. This measure of turbidity is very crude but it was not thought worth while to spend time in refining this part of the work.

The turbidity standards were made up according to standard methods which specify a mixture of 1 gram of

TABLE VI.
RESULTS OF ANALYSES OF SAMPLES COLLECTED WITH WATER SPRAY APPARATUS.

Date.	Source of dust.	Cubic feet of air sampled.	Time of sampling, hours.	Weather.	Constant error per 1/2 field.	Net count per 1/2 field.	Total count per cu. ft.	Turbidity.		Weight of sample (milli-grams).	Grams per million liters of air.	Comments.
								100 cc. sample.	Per 100 cu. ft. air.			
GROUP 1 (see Footnote).												
Oct. 13.	Outdoors—Bal- cony City Col- lege	300 300 270	1 1 1	Fair, warm, some breeze.	4.4 4.4 4.4	93.7 101.4 137.9	125,000 135,000 199,000	10 10 10	3 3 3	0 0 1	* -0.1 -0.1 0.13	
Nov. 8.	Outdoors—Wool- worth Bldg. Street Level 10th floor 58th floor	420 420 420	2 2 2	Fair and windy	15.0 15.0 15.0	117.8 71.7 23.3	118,000 72,000 23,000	100 30 20	25 7 5	13 4 2	1.1 0.3 0.17	At street level air was somewhat dusty
Oct. 27.	Business office	180 240	1 1	Fair, dry	4.0 4.0	78.1 76.6	172,000 128,000	50 40	30 15	1 3	0.2 0.4	
Oct. 21.	Department store basement	180 180 180 180	1 1 1 1	Fair	0 0 0 0	53.4 52.3 42.8 47.7	118,000 115,000 94,000 105,000	40 40 40 40	20 20 20 20	5 3 2 1	0.9 0.6 0.4 0.2	Sampling from 10.30 a.m. to 4.30 p.m. Dusting of stock 8.30-9.00 a.m. 77° D.B. 70% R.H.
GROUP 2.												
Nov. 9.	Pearl Button Fac- tory	180 180 210 180 210	1 1 1 1 1	Cloudy, some breeze	8.0 8.0 8.0 8.0 8.0	47.0 56.3 37.6 63.0 49.0	103,000 124,000 72,000 139,000 93,000	20 10 20 10 20	11 5 10 5 10	0 0 0 1 ..	-0.2 -0.2 -0.2 0.2 ...	75° D.B. 50% R.H. Drills going intermittently
Nov. 30.	School lunchroom (D)	210 210 210	1 1 1	Fair and some breeze, 60° F. temp.	8.0 8.0 8.0	136.0 103.0 51.3	258,000 196,000 97,000	150 100 50	70 50 25	6 11 2	1.0 1.9 0.3	500-1500 pupils present Very few present. 58° D.B. 36% R.H. Windows open most of time more than usual
Dec. 1.	School lunchroom (E)	210 210 210	1 1 1	Fair	8.0 8.0 8.0	136.5 401.2 574.3	259,000 762,000 1,090,000	100 200 300	50 100 150	4 10 12	0.7 1.7 2.0	30-150 present 30-150 present Pupils out. Janitor sweep- ing. 67° D.B. 35% R.H.
Nov. 10.	Marble cutting shop	210 210 210 210	1 1 1 1	Fair and windy	15.0 15.0 15.0 15.0	363.9 360.8 310.3 330.0	691,000 686,000 590,000 627,000	300 300 200 300	140 140 95 140	11 13 13 14	1.9 2.2 2.2 2.4	Compressed air chisels used

Date	Time	Place	Wind	Temp.	Humidity	Barometer	Direction	Remarks
Nov. 9		Subway platform	Fair	0	1,220.1	2,320,000	600	285
	210		1	0	767.6	1,460,000	400	190
	210		1	0	671.5	1,280,000	300	140
	210		1	0	592.0	1,130,000	300	140
	210		1	0	623.8	1,190,000	500	240
Oct. 19		Iron grinding room	Warm and humid	9.0	148.5	3,420,000	30	20
	175		50 min.	9.0	993.8	48,700,000	400	190
	210		1	9.0	985.5	14,800,000	800	300
	270		1	9.0	1,098.7	16,500,000	1,000	370
	270		1					
Group 3.								
Oct. 28		Hat fur factory	Fair and dry and some breeze	5.3	360.5	616,000	300	120
	240		1	5.3	234.7	435,000	200	85
	240		1	5.3	391.5	666,000	200	85
	240		1	5.3	412.6	701,000	200	85
	240		1	5.3	338.3	575,000	300	120
Nov. 16		Rag sorting shop	Fair	11.0	113.0	215,000	300	140
	210		1	11.0	152.7	300,000	300	140
	210		1	11.0	171.7	326,000	500	240
	210		1	11.0	298.9	508,000	900	430
	210		1	11.0	150.6	286,000	500	240
Oct. 20		Mattress renovating shop	Cloudy	3.0	157.3	419,000	50	350
	15 min.			3.0	231.0	1,530,000	300	500
	60			3.0	649.0	2,140,000	400	350
	120						1,500	715
	210		1 hour				5,000	2,100
	240		1 hour	3.0	4,320.0	7,140,000		
Nov. 3		Feather drying with starch	Cloudy and windy, cold	0	412.5	784,000	9,000	4,300
	210		1	0	455.0	867,000	10,000	4,750
	210		1	0	152.9	289,000	4,000	1,900
	210		1	0	84.2	160,000	2,000	955
	210		1	0	167.5	318,000	4,000	1,900

NOTE: Sampling places are grouped by the degree of dustiness as judged by observer when collecting sample. Group 1—Not Dusty. Group 2—Dusty. Group 3—Very Dusty.
* Minus sign means "less than."

* Minus sign means "less than."

infusorial earth with 1 liter of distilled water. The turbidity of 1 part of this mixture added to 9 parts of water represents a turbidity of 100 and so on down the scale. Our standards included the following turbidities: 10, 30, 50, 100, 200, 300, 400, 500, 1,000.

Reading the turbidity of a sample against a standard can be done with a fair degree of accuracy if the substances causing the turbidity are alike but we found much trouble in comparing the turbidity of different substances. The readings were made most readily by placing the two bottles against the light or against a light background. This method was preferred to the recommended procedure known as the Jackson method in water and sewage analysis work.

The difficulty encountered in attempting to evaluate the turbidity of a liquid with light-colored solids against one with dark-colored particles was very great. We believe that to increase the accuracy of this work special standards should be prepared for each type of dust analyzed, the standards themselves being made up from the dust which is being measured.

In the manner in which our readings were made we feel that a sample read as 30 was nearer 50 than 10, that a sample read as 200 was nearer 200 than either 100 or 300 but we should not attempt to give them any closer evaluation.

Microscopic Count.

Following the reading of turbidity 1 cc. and sometimes several cc. of the sample were removed for the micro-

scope count as previously described. A control count on the water and slide was made at each analysis and allowance has been made for this in Table VI.

Estimation by Weighing.

The balance of the sample was then filtered through a Gooch crucible whose net dry weight was known. The filter and sediment were then dried for 1 hour in an oven at approximately 99° C. A number of determinations proved that this treatment was sufficient without additional drying to give weights constant to 1 milligram.

Types of Dust Sampled.

During the months of September, October and November, 56 samples were collected from the following places—open air, iron grinding room, mattress renovating factory, department store basement, business office, a hat fur factory, a feather drying room where starch is used, a pearl button cutting room, a subway station, a marble polishing room, a rag sorting shop, and a school lunch room. The volume of air sampled varied from 15 to 420 cubic feet. A summary of the results of these analyses is presented in Table VI.

Discussion of Analytical Results.

It will be noted in this table that the sampling places have been grouped roughly in order of dustiness as judged by the observer and that there is in general a higher count, a greater turbidity and a heavier weight in the dustier places. This will be better shown in Table VII, where these figures have been averaged.

TABLE VII.

Group (observers' classification).	Count per cu. ft.	Turbidity per 100 cu. ft.	Weight (grams per million liters).
Not dusty.....	120,000	14	0.4
Dusty.....	3,900,000	120	2.0
Very dusty.....	1,200,000	1000	27.0

The most significant feature about Table VI is that the relationship between count, turbidity and weight is not constant for all dusts but varies with the type of dust. Taking, for instance, the entire lot of samples, it cannot be said that a very dusty place always has an excessive number of dust particles, a high turbidity or a great mass of dust as judged by weight.

Thus the rag sorting room is a very dusty place where the weights vary from 3.3 to 7.9 grams per million liters, yet the counts run from only 200,000 to 600,000. On the other hand the iron grinding room seems less dusty to the eye and nose yet its weights are about the same and the counts run from 3 to 50 million particles. These differences are of course explained by the size of the particles, their density and their color. The light-colored dusts seem dustier in a dark-tinted room than the dark-colored dust. This will evidently explain why the subway and iron grinding samples were not placed in the "very dusty" class although the analysis shows the dust content to have warranted this rating. Again the dust particles in these two places are very finely divided and there are more particles per gram than is the case with the rag dust.

What appears to be the most irregu-

lar finding is the small amount of dust collected from the pearl button factory which was described as dusty. This is undoubtedly due to the fact that the room in the neighborhood of the grinding wheels seemed dusty but that due to the constant wetting of the wheel and the removal of dust by means of a local exhaust system it is probable that very little dust was disseminated into other parts of the room. As the dust sampler was not located immediately in the range of the grinding wheel, it did not catch that dust-laden air which was apparent to the eye. Furthermore, because of their greater size there would be fewer particles for the same weight than with the iron dust.

The extraordinary weight of the starch samples and their comparatively small counts are also largely explained by the inability to obtain well mixed samples with the pipette because of the heavy turbidity of the liquid. Furthermore the starch particles are very large and their number per gram mass is slight compared with the heavier dusts.

The comments of the analyst on the general appearance of the dust particles under the microscope are given here as bearing on the above explanations.

*Description of Microscopic Appearance
of Dust from Various Sources.*

Out of Doors, Uptown—Mostly minute and round.
Out of Doors, Downtown—Large, very opaque and irregular. Tendency to cluster.
Business Office—Very small. Occasional fibres.
Dept. Store Basement—Irregular. Mostly fibres and lint.
Pearl Button Factory—Small, mostly round and uniform.
School Lunch Room (D)—Particles of every description, mostly small.
School Lunch Room (E)—Particles of every description, fibrous, angu-

lar, round, dots, transparent, opaque, etc.
Marble Polishing Room—Large, very irregular and arranged in clusters.
Subway Station—Mostly small, brown, irregular and jagged.
Iron Grinding Room—Irregular and jagged. Look like iron filings.
Hat Fur Factory—Small, irregular. Few hairs.
Rag Sorting Shop—Mostly fibres, some very long. Irregular lumps and groups.
Mattress Renovating Factory—All sizes, including fibres, hair and lint. Many infusoria.
Starch Drying Room—Large oval or round and very regular.

TABLE VIII.
CLASSIFICATION OF DUST PARTICLES FROM DIFFERENT ENVIRONMENTS BY SIZES. PER CENT. OF TOTAL COUNT.

Source.	Classes.					Comment.
	1.	2.	3.	4.	5.	
Approximate Area—sq. mm.	.04	.01	.0004	.0001	Too fine to count	
Outdoors, uptown.....	0	0	0.4	99.6	+	Very small
Outdoors, downtown.....	0	0.02	2.58	97.4	+	Large
Business office.....	0	0	0.85	99.15	±	Very small
Dept. store basement.....	0	0	2.	98.	—	Lint. Irregular
Pearl button factory.....	0	0	3.6	96.4	—	Regular. Small
School lunch room (D).....	0	0	2.5	97.5	+	Small
School lunch room (E).....	0	0.05	1.6	98.35	+	All sizes and shapes
Marble polishing room.....	0	0	0.5	99.50	+	Large
Subway station.....	0	0.02	0.5	99.48	—	Small
Iron grinding room.....	0	0.04	0.71	99.25	+	Small
Hat fur factory.....	0	0.08	1.68	98.14	+	Small
Rag sorting shop.....	0.02	0.27	3.83	95.88	+	Long fibres
Mattress renovating room...	0.01	0.10	1.06	98.83	+	All sizes
Starch room.....	0	0	26.	74.	—	Regular. Large

The division of the particles into the five classes of sizes fails to show as much variation as is suggested in the previous table of comments. This is because the variation in size occurs largely within Class 4. The proportion of the other sizes is about the same in all cases. The size table is presented for reference.

Agreement in the Variations of Count, Turbidity and Weight.

Attention has been directed in the preceding pages first to the apparent irregularity in the relationship of count, turbidity and weight, and the explanation for this, and secondly to the agreement of these different measures of dustiness for any one type of

ticular sample by the weight, secondly by averaging the resulting ratios for all the samples in the group, thirdly by noting the departure of the individual ratios from the average ratio, fourthly, by adding the departures regardless of sign and getting the average, and fifth by dividing the average of the unit departures by the group average.

If differences in count are accompanied by proportionate differences in weight, then the ratios in Col. 1 will be identical and Cols. 3, 4, and 5 will contain only zeros. The greater the variation in Col. 1 the larger the number in Col. 5, which thus becomes an "index of consistency" between count and weight.

Taking the list of analyses in its

EXAMPLE OF METHOD USED IN DETERMINING "INDEX OF CONSISTENCY."

Count.	Weight.	Count-Wt. (No. of hundred thousands di- vided by grams).	1. Ratio.	2. Average Column 1.	3. Departure of units from aver- age.	4. Aver. depart- ure of units from Group Average.	5. Ratio of Col. 4 to Col. 2 (%).
625,000	1.1	6.3/1.1	5.7		0.47		
535,000	0.8	5.4/0.8	6.8		0.63		
599,000	1.0	6.0/1.0	6.0	6.17	0.17	0.42	7

dust. This agreement is best shown with the rag, starch and mattress dust. To test this further there has been worked out for the entire lot of samples and for each type of dust separately, the relation between the variations in count and weight and in turbidity and weight. This computation is done, first by dividing the count for a par-

entirety there is a negligible relationship or consistency between count and weight, the index being 108, and a somewhat greater consistency between turbidity and weight, this index being 46.

Considering, however, each type of dust by itself we get the following figures (Table IX):

TABLE IX.

CONSISTENCY BETWEEN DIFFERENT MEASURES OF DUSTINESS FOR EACH PARTICULAR TYPE OF DUST.

	No. cases.	Index of consistency.	
		Count and weight (%).	Turbidity and weight (%).
Out of doors, uptown.....	3	19	0
Out of doors, downtown.....	3	32	28
Business office.....	2	44	60
Dept. store basement.....	4	48	47
Pearl button factory.....	5	20	35
School lunch room (D).....	3	37	37
School lunch room (E).....	3	14	9
Marble polishing room.....	4	12	15
Subway station.....	5	28	21
Iron grinding room.....	4	54	27
Hat fur factory.....	5	24	21
Rag sorting shop.....	5	25	17
Mattress renovating room.....	4	35	44
Starch room.....	5	14	13
Average.....		29.3%	25.0%

It is recognized at the outset that the accuracy of the consistency indices for the separate groups is quite unreliable from a purely mathematical standpoint owing to the few members in each group. In those cases also where the count-weight ratio and the turbidity-weight ratio are farthest from agreement, namely, out of doors uptown, business office, pearl button factory and iron grinding room, it will be seen that the weights are so small as to invalidate the calculations or, in the case of the last named, the counts are so exceptionally high as to cause grave inaccuracies in estimation. It is felt, nevertheless, that the agreement of the two sets of computations is significant in that it indicates certain

peculiarities about different types of dust which render any interpretation of dustiness on the basis of count alone to be incomplete. And it is further suggested that the determination of dustiness by turbidity is as exact as counting.

An examination into the relative merits of the count and weight as independent measures of dustiness are pictured in Tables X and XI, which are computed from Table VI. In the following two tables we have recorded the number of cases falling within a particular weight group or count group and have also classified the results on the basis of air conditions in the room as reported by the observer.

TABLE X.

NUMERICAL DISTRIBUTION OF WEIGHT MEASUREMENTS FOR THREE GRADES OF OBSERVED DUSTINESS. (NUMBER OF CASES WITHIN EACH GROUP.)

	Weight (grams per million liters).				
	0.5 and below.	0.6-1.0.	1.1-5.0.	5.1-10.	10.1+.
Not dusty.....	9	2	1	0	0
Dusty.....	6	2	14	1	0
Very dusty.....	0	0	12	2	6

TABLE XI.

NUMERICAL DISTRIBUTION OF COUNT MEASUREMENTS FOR THREE GRADES OF OBSERVED DUSTINESS. (NUMBER OF CASES WITHIN EACH GROUP.)

	Count (particles per cubic foot).					
	100,000 and below.	110,000 to 500,000.	510,000 to 1,000,000.	1,100,000 to 5,000,000.	5,100,000 to 10,000,000.	10,000,000 +.
Not dusty.....	3	9	0	0	0	0
Dusty.....	3	6	6	6	0	3
Very dusty.....	0	8	7	3	1	0

Rough as these measures are it is evident that the dustier the appearance of the air the greater is the dust content of the sample as determined by weight. On the other hand this is not so true with the count, for it is frequently found that the number of particles is greater in places which seem moderately dusty than in those reported as very dusty.

Efficiency of Water Spray Sampler.

In the first part of this article there was described an effort to compare the relative efficiency of the three types of samplers. It at first appeared that

the water spray apparatus collected but 70 per cent. of the particles caught in the sugar filter. This conclusion was based entirely upon counts, whose reliability have since been discredited; and upon analyses of small air samples, which practice we now know to be inaccurate. That the efficiency of the spray apparatus is actually very high was indicated by a new test.

First carmine powder was gently blown over the inlet of the sampler while in operation, a small glass slide coated on the under side with glycerine having first been suspended in the outlet end of the glass bulb. The

water reddened immediately but it was only after several minutes that a visible red deposit was noticed on the wire supporting the glass slide. Examination of this slide under the microscope showed the presence of many carmine particles.

This test was then duplicated quantitatively using in this instance dessicated pearl dust. A small amount was placed in a test tube and the mouth tightly covered with bolting cloth. The tube and contents were weighed, then while the sampler was running this tube was gently tapped over the inlet so as to remove, a little at a time, an appreciable quantity of dust. The tube was again weighed, the difference being the amount of dust dislodged. The dust content of the sampler was then determined by filtering the water through a Gooch crucible. The results of tests made in this manner on two different occasions gave the following figures:

utes, however, which represents 17.5 cubic feet of air, and as reference to Table I will bear out, dust collected from even 200 feet of air in a comparable environment—for instance the business office or the department store basement—failed to give more than 5 milligrams, it is highly improbable that 17.5 cubic feet of air would contain even 1 milligram of dust. Thus while it is evident that some very light dust passes through the sampler, the amount as judged by the quantitative determination is very small indeed.

This direct evidence as to the sampler's efficiency is further supported in a general way by comparing the weight results in Table VI with the amounts of dust found in similar environments by other observers (See Table XII).

In the ten types of dust shown in this table a comparison of the results of two or more observers is possible in six cases. Our results fit in very well

	Test 1. Milligrams.	Test 2. Milligrams.
Pearl dust added to sampler.....	521	102
Pearl dust recovered in water.....	513	100
Lost.....	8	2
Per cent. dust collected by sampler.....	98.5%	98.0%

A possible criticism of this procedure would be that the air of the room was being filtered in the sampler along with the pearl dust and that this aerial dust may have made up for any pearl dust which might have escaped the water thus covering the error and making the efficiency appear too great. The sampler was run for but five min-

utes with these analyses excepting those obtained by Graham-Rogers, whose high figures are accounted for in all probability by the very small volume of air sampled, namely 4 to 18 cubic feet. It is also possible in the case of the factory dusts that conditions were much worse at the time those samples were taken than they are now.

TABLE XII.

Type of dust.	Sampler.	Observer.	Weight of dust (grams per million liters).	Volume of sample, cu. ft.	Time of sampling, minutes.	Rate cu. ft. per minute.
Country	Water bubbling	Graham-Rogers (15)	7.0	18	...	...
	Paper thimble	Mariner & Hoskins (12)	.06	1000	360	2.8
	Water spray	Palmer et. al. (14)	0.1	300	60	5.0
City street . .	Water bubbling	Graham-Rogers	30.0-114.0	18	...	...
	Paper thimble	Mariner & Hoskins	2.5	1000	360	2.8
	Sugar filter	Soper	1.8	50	...	...
	.....	Fodor	0.4	.....	...	...
	Water spray	P.	1.1	420	120	3.5
Subway	Sugar filter	S.	2.0-7.0	50	...	...
	Water spray	P.	1.7-3.0	210	60	3.5
Hat fur	Water bubbling	G-R.	17.0-80.0	18	...	...
	Water spray	P.	2.0-5.0	240	60	4.0
Pearl button	Water bubbling	G-R.	5.0-342.0	18	...	...
	Water spray	P.	0.2	190	60	3.1
Rag	Water bubbling	G-R.	20.0	18	...	...
	Water spray	P.	3.0-8.0	210	60	3.5
Pottery	Cotton wool	Ditman (11)	6.0-60.0	8	15	0.5
Mine rock . . .	Sugar filter	Lanza (8)	6.0-80.0 (Total solids)	1	2	0.6
Lead	Cotton wool	Duckering (10)	1.0-563.0	10	180	0.06
Garbage flue	Wire mesh and Water bubbling	Klein (9)	143.0-3210.0	20	20	1.0

It is probable that the most reliable of all these figures are those reported by Mariner & Hoskins for here a fine paper thimble filter, very effective as a dust collector, was used and samples were collected over a six-hour period, approximately 1,000 cubic feet of air being passed. In the thinly settled or park districts of Chicago they found

.06 grams per million liters. We found in our samples taken at a balcony window on the third floor of the City College building about 0.1 grams per million liters. In the downtown loop district of Chicago their analyses averaged 2.5 grams per million liters. Our single two-hour sample at the street level near the Woolworth Build-

ing amounted to 1.1 grams per million liters. The figures of 1.8 obtained in the New York streets by Soper and 0.4 reported by Fodor from a level 15 feet above the street in Budapest are in general agreement with the above.

From this table it is possible to obtain a rough idea of the amount of dust to be expected in various types of environments. Expressed in grams per million liters the figure for country air is less than 0.1, for city air at street level about 1.0, for industrial processes from 1.0 to 100. Surveying the volumes of air commonly sampled with these different methods together with the rate of sampling we believe the spray sampler occupies a very favorable position in being a portable device which is capable of sampling with high efficiency several hundred cubic feet of air per hour.

CONCLUSION.

In summarizing, while we have great faith in the merits of the water spray sampler as a practical field apparatus, we do not wish to maintain that it is applicable to all situations or that it supersedes all other methods. There will always be a place for apparatus designed to meet certain special situations. Thus the sugar filter as used by Lanza is well adapted for excessively dusty atmospheres or where electric current is not available. Likewise the Whipples' study of dust distribution in Cambridge gave the information sought in a much simpler way and possibly in a manner that could not have been met at all by the water spray sampler.

In this connection, also, we feel that there is a field for the Graham-Rogers

plate, used not in conjunction with an air-pump but simply as a gravity collecting plate. There are cases where either electric current is not available or the noise of the pump would not permit collection in this manner, and in such instances timed gravity collection would give counts comparative at least for similar types of dust.

For other work such as factory inspections, where samples representative of the air condition for varying periods of the day are desired, it is our belief that the water spray sampler is superior to the other methods we have reviewed.

In the technique to be followed with the water spray sampler we desire to express certain rules and precautions.

1. The rate of air flow should not exceed 5 cubic feet per minute.

2. To obtain sufficient dust for weighing purposes in atmospheres that are not visibly dusty there are required from 200 to 400 cubic feet of air.

3. In environments that are visibly dusty sampling need not be extended beyond 200 cubic feet and in fact it is unnecessary to exceed 100 cubic feet providing the water by that time is noticeably turbid, that is, equalling a reading of 200 on the turbidity scale.

4. For general inspection work we do not feel that it is necessary to measure the turbidity so long as the weight and count determinations are made.

5. For weight determinations it is recommended that the reading be carried out to a tenth of a milligram.

6. In counting particles in the Sedgwick-Rafter cell, it is suggested that a quarter field be counted at five points in the cell, at the center and

near the four corners. (This precaution is intended to minimize the inclination to seek out crowded areas of the plate to count and pass over the sparsely dotted space.)

7. Two distinct cubic centimeters of the sample should be counted in the Sedgwick-Rafter cell. The average count for the sample is then to be determined from the ten counts, five being made on each slide.

8. The cell should stand five minutes after being filled before the count is made. This time is sufficient to allow the dust particles to come to position either at the bottom of the cell or to the surface of the water. Otherwise particles between the top and bottom will be missed as it is not feasible to alter the focus of the microscope so as to search the entire depth of the liquid.

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CONCERNING OURSELVES.

This issue of the JOURNAL should reach the majority of its readers prior to the annual meeting of the American Public Health Association, which takes place in Cincinnati October 24 to 27.

It is certain that the attendance will be large, despite the fact that the meeting comes at a time when it is difficult for those members of the Association who are teachers to be present.

It is over forty years since the Association met in Cincinnati. The attendance at that time was but seventeen. The great discoveries and advances in public health knowledge are reflected in the constant growth in the membership of the Association and the circulation of its JOURNAL.

A special plea for assistance from members and subscribers is now being made. The growth of both Association and JOURNAL are shown graphically in the advertising pages. That progress has been made is evident. Undoubtedly the progress would be much more rapid if funds were at our disposal to carry on an extensive campaign. Such funds are not available so Association and JOURNAL must continue to advance as in the past through the kindly efforts of their friends.

Health education looms large in modern public health work. That it is desirable to educate the public in health matters is accepted. It is obvious that first we must educate the educator, namely the health officer, the sanitary inspector, and the large number of others who are directly or indirectly engaged in the inspiring work of public health. Education is never finished and in our chosen line of work new discoveries are constantly made and new methods devised and used, which we want to be informed about.

Your secretary and editor has perhaps wearied you with his appeals for assistance in helping to acquaint others with the work of both Association and JOURNAL. He makes no apology believing that it would be a dereliction of duty did he not do everything in his power to advance the objects for which both the Association and JOURNAL have faith in.

DEATH-RATES IN THE REGISTRATION AREA OF THE UNITED STATES IN 1915.

A preliminary statement just made public by the Bureau of the Census, Department of Commerce, shows a death-rate of 13.5—the lowest on record—per 1,000 estimated population of the registration area of the United States in 1915. This rate was based on 909,155 deaths returned from 25 states (in one of which, North Carolina, only municipalities of 1,000 population and over in 1910 were included), the District of Columbia, and 41 cities in nonregistration states, the total population of this area in 1915 being estimated at 67,337,000, or 67.1 per cent. of the total estimated population of the United States.

There is a widespread and increasing interest throughout the country in respect to vital statistics. The states of North and South Carolina, which recently enacted the "model law" for the registration of births and deaths, were admitted to the death-registration area for 1916, increasing the estimated population of the area to 70.2 per cent. of the total for the United States in that year.

The death-rate for 1915, 13.5 per 1,000 population, is the lowest ever recorded, the most favorable year prior to 1915 having been 1914, for which the rate was 13.6. It is markedly lower than the average rate for the five-year period 1901 to 1905, which was 16.2. The decrease thus amounts to 16.7 per cent., or almost exactly one-sixth, during a little more than a decade. When due allowance is made for the addition of many new states to the registration area between 1905 and 1915, and the comparison is confined to the group of registration states as constituted during the period 1901-5—the present population of which is about one fourth of the total for the country—there is still shown a very considerable decrease, from 15.9 to 14.3 per 1,000 population, or 10.1 per cent. This decrease, on the basis of the present population, would amount to 42,876 deaths. On the assumption that a corresponding reduction has taken place throughout the entire country, this would indicate a saving of approximately 170,000 lives in 1915 for the United States as a whole.

It is certain that the great progress made during recent years in the sciences of medicine and sanitation, together with the wide-spread awakening of the people throughout the United States to the support of public health authorities, has resulted in the saving annually of scores of thousands of lives that would have been lost under the conditions prevailing only a few years ago.

It is pointed out in the statement issued to the press that "the rates given are crude rates, which make no allowance for differences in the sex and age distribution of the population, and that, furthermore, the rates for certain localities are materially affected by deaths of non-residents who are attracted to those localities by their favorable climate or by their superior hospital facilities. Inferences in regard to the relative healthfulness of different states and cities should not, therefore, be drawn without more thorough investigation."

It is to be hoped that the newspapers will give better heed to this sound advice than they have in the past and save us from the absurd comparisons that caused a prominent health officer to express the opinion that there should be a law prohibiting the sending of crude death-rates through the mail.

The 1915 figures were prepared under the supervision of Mr. R. C. Lappin.

THE CONTROL OF COMMUNICABLE DISEASES IN SCHOOLS.

S. JOSEPHINE BAKER, M. D.,

Director, Bureau of Child Hygiene, Department of Health, New York City.

Read before a General Session of the American Public Health Association, Rochester, N. Y., Friday, September 10, 1915.

Dr. Josephine Baker, as director of one of the most important bureaus in the New York City Department of Health, has become one of the country's best known women health workers. Her experience in the matter of which this paper treats has naturally been very extensive.

THEORETICALLY, the control of communicable diseases consists in making a diagnosis sufficiently early so that the patient may be isolated and infection of others prevented. Practically, the elimination of infection involves the employment of educational and preventive, as well as corrective, sanitary and hygienic measures.

In a discussion of the more common types of infections, exclusive of tuberculosis, we are led inevitably to a consideration of their age grouping and it is a matter of record, as well as common knowledge, that the great majority occur during that period of life which is properly known as the "school age" or from five to fifteen years of age. We speak of the "contagious diseases of childhood" and inevitably associate their occurrence with the beginning of school attendance. The stigma placed upon schools as foci for the dissemination of infection has not been undeserved. With regard to the more common types, including scarlet fever, diphtheria, measles, german measles, whooping-cough, mumps and

chickenpox, the curve of incidence begins with the opening of the schools in the fall, reaching its maximum in the late winter months, and falling again to the minimum as the schools close in the spring. It is probably of equal, or even greater importance, to note that the curve also follows closely the advent and increasing tendency of lowered outdoor temperature with the habit of living in overheated and closed houses or schoolrooms. Both of these factors may be considered as an indictment of school life as it still exists in too large a proportion of our communities.

In tuberculosis the causative factors relate equally to the school and to the home. If we do not definitely regard this disease as one mainly incident to child life, at least we are becoming increasingly aware that the infection is commonly acquired during childhood and that the degree of physical resistance of the individual which is to ultimately decide whether the infection shall remain latent or shall develop, depends to a very large extent upon the degree of physical health

which may be acquired during the formative years of childhood.

The school, with its segregation of large numbers of children during the winter months, offers a unique opportunity for early detection of cases of communicable disease. The routine control of infections by sanitary authorities takes as its starting point the actual reporting of a case of illness; much may then be done by enforcing procedures of isolation, but too often such notification occurs after the child has had abundant opportunity of spreading the infection both at school and at home. The ordinary tenement house in our cities may now be considered as the starting point of most local epidemics; the school, where proper health supervision is maintained, can no longer be accused of holding primarily this unenviable reputation.

School medical inspection was instituted in this country for this purpose, at first in Boston in 1894, when Commissioner Durgin started such a system to control an epidemic of diphtheria; a few years later New York City and Philadelphia recognized the value of such a procedure and at the present time, although school medical inspection has developed to include the vastly important control of all matters affecting the health of the child, the early detection and exclusion from school of children showing any symptoms of a communicable disease still remains as the part of the system which is primarily the function of health departments. Logically, the prevention of communicable diseases is so closely interrelated with the con-

trol of the general physical well-being of the child that in any well-planned and effective system of school medical inspection it is difficult, if not actually dangerous, to attempt any separation of function or authority.

As a working program I would submit the one followed by the Bureau of Child Hygiene of the Department of Health of New York City for the past six years.

The school building and its maintenance deserve first consideration. Classrooms should be large enough to provide at least three hundred cubic feet of air space for each pupil; each room should have direct sunlight at some period of the school day. Each child should have an individual desk with aisles at least two feet wide between the rows. Dry sweeping and dusting must be prohibited and proper oil dressing provided for the floors. Pencils should be individual and collected at the end of each day, in separate stout manila envelopes, marked with the name of the child, so that distribution may be made each morning. Lastly, and most important, adequate and free ventilation, with the provision of air at the right temperature and degree of humidity, is imperative.

In the school building, cloakrooms with individual ventilated lockers, or hooks placed at wide enough intervals so that the children's outer garments shall not be in contact, are essential. The further installation of drinking fountains or the use of the individual drinking cup, the elimination of the common towel and the provision of adequate and cleanly toilet and wash-

ing facilities, will all provide the needed surety of the first line of defense against the spread of infection in the school.

Many of the above installations and methods have not yet been attained in the New York City schools. The Board of Education, so far, has not placed in operation any effective plan for adequate ventilation or cleaning of classrooms, proper washing facilities or well-arranged cloakrooms, but it is hoped that these important matters will receive attention within the near future.

The main control for the prevention of the spread of communicable diseases in schools is dependent upon the system of school medical inspection. It is evident that such a system, to be effective, must rely upon such an early detection of symptoms which may indicate the onset of a communicable disease that the child may be excluded from school attendance and properly isolated at home before he has had an opportunity of infecting others. In other words, the child must be excluded upon suspicion. If we wait until an accurate diagnosis can be made, the harm has already been done.

In New York City each day, each school receives a printed list of all cases of communicable diseases reported to the Department of Health on the previous day. At the opening of the school session, this list, with a special blank book, is sent to each classroom, where the teacher enters the name of each pupil in the class who is noted on the list or who is a member of the family of the patient. Such children are excluded from school at

once, to await the further action of the division of contagious diseases of the department. The book is then returned to the school nurse, who reports each day to the school inspector where two or more cases of any one disease have occurred in any one classroom. Thereafter, the inspector visits that class each morning, examining each child for any evidence of illness and excluding suspicious cases. If the disease is diphtheria, cultures are taken from the throat of each child and all cases showing the presence of the diphtheria bacillus are excluded.

Each day each school, except a few in the outlying districts, is visited by the school doctor or the school nurse. The teachers are instructed to send to the doctor's room, as soon as the classes assemble, every child who shows any evidence of illness in any form. Upon reaching the school, the doctor or nurse examines, in a room set apart for this purpose, (a) all such children referred by the teachers as suspected cases of illness, (b) all children returning after having been ill, and (c) all children who have returned to school after any unexplained absence. At this time, any child who shows any symptoms which might indicate the development of a communicable disease, is excluded from school attendance. Cultures are taken in every case of sore throat and the child is excluded. Within twenty-four hours the child is visited at his home by an inspector, who makes the diagnosis, either isolating the case and transferring it to the supervision of the division of contagious diseases, which thereupon assumes control, or, if no communicable

disease has developed, allowing the child to return to school. About 80 per cent. of the excluded children are found to have true cases of communicable disease; the loss of one day's schooling for the remaining 20 per cent. is of small consequence when compared with the effectiveness of this early exclusion.

Trained nurses have been almost exclusively used for the past two years for the purpose of early detection of the symptoms of suspected communicable disease, and because nurses are trained to detect symptoms and are not required or expected to diagnose, the percentage of cases where the presence of a communicable disease is afterwards confirmed averages the same as when physicians were exclusively employed for this purpose.

The early detection of tuberculosis results from observation of children who have been losing weight, appear flushed or hectic, with or without an accompanying cough, or who are designated as suspicious cases by the school doctor as a result of his regular physical examination. Such cases are referred to the Bureau of Preventable Diseases, which sends a diagnostician to the child's home to make the detailed or repeated examinations necessary to confirm the tentative diagnosis.

A monthly routine inspection of all children in each school, the physical examinations with consequent follow-up visits to adjust insanitary and unhygienic home conditions and to secure proper treatment of physical defects, are added preventive measures. In addition, at the end of each school day, the principals send to the

school doctors a list of all children who have been absent from school more than three days for any unassigned cause. These children are visited at home by the doctor and many cases of unreported, and therefore uncontrolled, cases of communicable diseases are discovered by this so-called "absentee visiting".

This brief outline enumerates the main features of our system. The results may be stated even more briefly. During the six years since this system went into effect, it has not been necessary to close any public school in New York City on account of an epidemic of communicable disease, and in only a few instances has it been considered wise to close a classroom. This latter action in each instance has been taken not because we have considered it the best procedure but because the principal or teacher has become unnecessarily apprehensive after the occurrence of a few cases of illness in children who normally attended the class in question but who, except in isolated instances, were not in school during the period of incubation.

In this connection, I wish to emphasize the wisdom of keeping children in school rather than closing schools in the presence of communicable diseases in a community. School contact instances of infection are rare if the system of school medical inspection is at all adequate, and the presence of the children in the classroom each day, where they can be systematically observed for symptoms of approaching illness, offers a far greater degree of safety to the child and protection to

other children than can be attained by allowing them to be in their homes or on the street in indiscriminate contact with other children.

By following the system outlined above during the six-year period since the organization of the Bureau of Child Hygiene, out of an average school population of 800,000 children in New York City, an average of five thousand, or less than 1 per cent. have been necessarily excluded from school

each year because of the presence of a general constitutional contagious disease.

Such control may be exercised in any community, and the school, instead of being the focus for the dissemination of communicable diseases, may become, because of its very adaptability to control, one of the most valuable methods we have of limiting the spread of communicable diseases in any community.



LONDON STATISTICS.

London Statistics, a volume of 600 pages, recently issued by the county council, gives evidence of the effect of the war on the health and well-being of citizens of the Metropolis. The population of the county area in June, 1915, was estimated to be 4,551,204 persons. By reason of enlistments, the civil population was smaller last year than that of the middle of 1914, but it is significant that the death-rate has increased. In the first 18 months of the war 104,571 persons died, compared with 97,333 during the preceding 18 months, and every age and both sexes were affected by the increase. "One would have expected a reduction," says the report, "notwithstanding that the enlistments came from among the 'good' lives. . . . The figures suggest the possibility of an influx of population of military age into London since the war. If so, it must have been an influx of women." Whether the cause is traceable to a shortage of medical aid generally, to local conditions of over-pressure or overcrowding, or to a combination of these with other causes, no evidence is as yet available to show.

The first nine months and the second nine months of the war yielded 82,628 and 74,948

births respectively. In London, as generally throughout the country, statistics prove that there is no truth in the statements which have been made as to an increase in the number of illegitimate births.

The war has evidently been responsible for hastening many weddings. Whereas in the preceding five quarters there were 51,239 marriages registered, the number leapt up to 65,522 in the five quarters since the outbreak of hostilities.

Pauperism has steadily declined during the past year, both indoor and outdoor, and it is further encouraging to note that "with plentiful employment there has taken place an almost general rise in wages. The movement in London has been part of the movement throughout the country."

As a set-off against this, the increased cost of living has to be taken into account, but "in spite of the steep rise during 1915, the prices of bread and wheat are still below the average of the 110 years 1800-1910. They are also both less than half the price of the same commodities in 1812, but the Napoleonic wars by that time were in their eighteenth year."—*Medical officer*.

THE WEST VIRGINIA FLOOD OF AUGUST 9, 1916, AND THE HEALTH RELIEF MEASURES.

MAYO TOLMAN,

*Director and Chief Engineer, Division of Sanitary Engineering, West Virginia
State Department of Health.*

ON THE morning of August 9, 1916, Cabin Creek, Coal River, Paint Creek and Mud River Districts of West Virginia, an area of some 400 square miles, were visited with a disastrous flood. Newspaper reports stated that the flood was caused by a cloud-burst, but investigation shows that the storm was an exceedingly heavy downpour of several hours' duration. It traveled in a southeasterly direction, the center passing through Griffithsville on Mud River, Horse Creek and Nelson on Coal River, and Kayford on Cabin Creek. The greatest damage was wrought at Kayford, where, from the best data available it appears that the storm lasted from 4.30 a. m. to 9 a. m. There are no rain gauges in the flood district, and all estimates of the rainfall are probably much in error. The most accurate record of which I could learn was that obtained by a retired mine fire boss at Kayford who stated that 5.82 inches fell during the storm. His measurement was made in an ice cream can.

The flood reached a much greater depth on Coal River than on Cabin Creek. At Seth, on the former stream, 54 feet 2 inches were read on a privately maintained gauge, while the greatest depth encountered on Cabin Creek was about thirty-two feet. The damage, however, was far greater on the latter stream, as it was closely built up with mining towns, whereas on Coal River there are but comparatively few mines opened, and the nar-

row river bottoms are given over to small farms.

It is estimated that seventy-one lives were lost in the flood and that over nine hundred houses were entirely wrecked, with a total property damage in excess of \$2,000,000. The Chesapeake & Ohio Railroad had the greater portion of its road bed for eighteen miles obliterated. Not a single railroad bridge in the entire distance was left in position. At only two points was it possible to tell where the county road had been previous to the flood.

On the morning of the flood Dr. S. L. Jepson, the Health Commissioner of West Virginia, sent one of the assistant engineers up Cabin Creek to ascertain the extent of the disaster. The writer was in Pittsburgh at the time, but realizing the grave danger of serious outbreaks of typhoid due to contamination of wells which constituted the only source of drinking water for a population of over 10,000 in the flood area, he returned to Charleston immediately, after first having telegraphed to Baltimore for a large supply of anti-typhoid vaccine. All the chloride of lime in Charleston and Huntington, West Virginia, and Columbus, Ohio, was obtained by telegraph and an order placed for several hundred pounds in addition. A local chemical manufacturing company was instructed to hold several carloads of agricultural lime ready for immediate shipment; also instructions were telegraphed to the state printer to have

several hundred posters 18 by 24 inches struck off with the statement "This Well Probably Safe for Drinking."

As there were a number of cases of typhoid fever on Cabin Creek and Coal River previous to the flood, the chance that the wells, a great majority of which were flooded by the sudden rise of water, had become dangerously contaminated, was the chief problem that faced the Division of Sanitary Engineering.

To lessen this danger as far as possible the writer with his two assistant

engineers, Mr. Ellis S. Tisdale and Mr. Andrew N. Wardle, both graduates of the Massachusetts Institute of Technology, entered the district prepared to disinfect all wells that had not been filled with mud and silt and to administer the anti-typhoid vaccine to all who would take it. As the roads were washed away and the valley strewn with wreckage, it was impossible to get even a pack animal through, and we were obliged to carry all our provisions, blankets, vaccine and chloride of lime, on our backs.

The writer deemed it wise to make a hurried trip through the entire valley, disinfecting at least one well in each community that safe water might be obtained at all points as quickly as possible, and then after this establish headquarters at some central point and from this place to direct the disinfection of the other wells as fast as they could be cleaned. The first day some thirty wells, scattered over a distance of ten miles, were each treated with from a quarter to half a pound of chloride of lime. As each well was treated it was posted with a sign, "This Well Probably Safe for Drinking."

The coöperation of the hospital corps of the West Virginia National Guard, which had been ordered into the flood district, and of the local mine doctors in the giving of the anti-typhoid vaccine, was solicited and obtained. A campaign of publicity to overcome the prejudice that the miners entertain toward all forms of vaccine was inaugurated at the suggestion of one of the doctors. Small boys were paid 25 cents apiece to carry



All wells that were in any way fit for use were disinfected with chloride of lime and posted as shown.



The ruined Y. M. C. A. at Eskdale. Headquarters of the Division of Sanitary Engineering.

posters up and down the valley stating that the anti-typhoid treatment would be given free at certain places at certain times. Other posters had skulls and cross-bones with "Beware of Typhoid. Be vaccinated before it is too late." At each town visited, some small boy who looked brave would be singled out and given the treatment. Then he was told to jolly his chums about being cowards, with the result that some fifteen or twenty small boys would take the treatment. These would be divided up in squads of four and sent marching through the town with their left sleeve rolled up, calling out "It doesn't hurt to get vaccinated." The results of this system of advertising surpassed our best expectations. One doctor vaccinated over 400 the first afternoon. We slowly waked up the interests of the people to such an extent that the usual salutation in passing the time of day when two friends met was, "Been vaccinated yet, Bill?" "Yep, took it half an hour ago.

Don't see why I ever swore I'd never take it. Didn't bother me as much as a pin scratch."

Each doctor in the flood district was visited in person by one of the engineers and given the amount of typhoid vaccine that he felt he could probably use. Nearly every doctor told us that he wouldn't need many treatments, as the miners could not be made to take it; yet before two days were up nearly all had sent messengers to our headquarters in the ruined Y. M. C. A. building at Eskdale, asking for more. The final returns giving the name, address, etc., of each person vaccinated have not as yet been received from the doctors, but the writer has returns on his desk showing that at least 4,467 civilians were vaccinated. It is estimated that 90 per cent. of this number will take the full three doses, and that the total number of those receiving one dose will pass the 5,000 mark.

As yet no word had reached the

writer's office of any infected arms, which is remarkable when it is considered that some of the doctors would vaccinate as many as ten people without resterilizing the needle. Whenever possible we attempted to prevent such practice and supplied the doctors with grain alcohol that they might at least rinse the needles.

It should be noted that the engineers took charge of the disposal of the bodies of dead animals, as mules, dogs, hogs, etc., which were found in numbers in the piles of débris. As fast as the railroad was rebuilt into the district, lime was shipped in for use in sweetening the ground about the houses, many of which had two or three feet of mud on the floors. Lime was also freely used about the privies.

The results obtained from the wholesale anti-typhoid vaccination on Cabin Creek, Coal River and Mud River should prove of great interest to health officers throughout the entire country as, so far as the writer is aware, it is the largest number of civilians ever vaccinated at one time. Larger numbers have received the treatment in the army and in large labor camps, but in these places living conditions are highly specialized, the food, water, housing conditions and health being carefully looked after at all times, whereas in the work done in the flood district of West Virginia we now have an opportunity to study the effectiveness of the treatment under ordinary living conditions in all stations of life, from the mine superintendent to the most illiterate miner and his family.

The work of the Division of Sanitary Engineering should prove of great value. The West Virginia miner



Ruins of power plant of Chesapeake and Ohio R. R. at Eskdale.

is nomadic in his habits, as he seldom lives more than a few months at one place. The flood has caused a general exodus of miners from the creek, 60 per cent. having left, and unless every precaution against an outbreak of typhoid had been taken, the disease would probably have been carried to all parts of West Virginia, and to Ohio and Kentucky as well.

In closing it should be noted that the work could not have been accomplished without the aid of the local doctors who everywhere gave valuable assistance.

SIX MONTHS OF THE HARRISON ACT.

C. E. TERRY, M. D.,
City Health Officer, Jacksonville, Fla.

Read before a General Session of the American Public Health Association, Rochester, N. Y., September 9, 1915.

Public health officials, the medical profession generally, pharmacists, lawyers, legislators and the public have all watched with interest the working of the Harrison Act, by means of which the federal government has taken part in the effort to control the narcotic drug traffic. In Doctor Terry's city, special efforts have been made in this respect.

IN PRESENTING these impressions of the national anti-narcotic law, known as the Harrison Act, of its provisions as directed at the various sources of supply and distribution of the drugs with which it deals and of its apparent practical workings since March 1 of the present year (1915), no criticism is intended other than such as may in some measure, possibly, assist in determining the factors which have united to establish this nationwide problem of narcotism and the lines of attack which promise the most efficient control.

It is undoubtedly too early to form any definite judgment as to the ultimate efficiency of this act of legislation. So replete is it with provisos and exemptions, so non-specific on certain essential points while conferring powers of such sweeping character on those to whom its enforcement is entrusted, that an early judgment might lead one to conclude, with almost equal likelihood of truth, that it will fall far short of accomplishing its apparent design or, on the other hand, that no possible leak has been overlooked in its broad scope.

Such evident confusion of opinion has already become manifest and an earnest effort on the part of the writer to reconcile the several sections of this Act as relating to the drug traffic, has failed, in one instance at least, to clarify the situation.

It is probably quite fair to assume, as a basis for what follows, that opium and coco leaves and their derivatives and preparations have acquired a widespread non-legitimate use in this country and that Congress enacted the Harrison law in order to limit the employment of these poisonous substances to legitimate and proper channels.

It would also appear evident that "legitimate," as applied to the employment of these drugs, means such use as would benefit those consuming them or at least such use as might be reasonably expected to result in benefit by those whose training and experience render them capable of judgment.

Bearing these premises in mind, one is forced to the inevitable conclusion that, in the present state of medical knowledge, the legitimate use of these drugs is distinctly limited to the treat-

ment of disease and the relief of suffering which simpler and more permanent measures may fail to accomplish.

Conversely, any legislation, which fails to confine to such purposes the employment of these drugs, falls short, in exact measure of such failure, of accomplishing its design. In order to avoid any charge of "local factors," expressions from a wide territory have been sought, through a questionnaire sent out under the direction of your Committee on Habit-forming Drugs. Officials in every state have been addressed, the data acquired representing about fifty cities from which replies were received.

The questions thus circulated dealt with general aspects of the drug problem, some of the principal sources of supply and certain exemptions of the federal law, seeking to relate each to the purpose of the Act.

In what follows it must be borne in mind that the Act has not as yet been enforced with equal vigor in all communities, that the territory assigned to each deputy is large and that the correspondents may not be accurately informed in all cases.

Fifty-five replies have been received. In reply to the question "Has the Harrison Act been enforced in your community?"—43 reply in the affirmative, 5 say "No," 4 "Not actively," while 3 are in doubt. There is thus indicated, for the most part, official activity, as would indeed be inferred from the press accounts throughout the country.

As to whether it had been customary for physicians to write prescriptions for drug addicts, prior to the enforce-

ment of the Harrison Act, 37 replied "Yes," 6 "No," 4 were uncertain but thought it had been, while 8 claimed that they were uninformed or that druggists made direct sales and the formality of a physician's prescription was unnecessary. Asked whether the Harrison Act had stopped this practice, 10 replied "Yes," 4 "No," 24 "To a great extent," while 7 were in doubt or uninformed.

The well known rôles played by certain members of the medical profession in the tragedies of drug addictions in the past, attach especial interest to the replies made to these two questions. Owing to the relatively greater restrictions thrown around dealers in drugs, by the Harrison Act, the medical profession occupies a conspicuous and responsible position in the solution of the problem of drug addiction and it would appear futile to attempt to control the situation without either the *complete coöperation* of physicians or—*ample* restriction of their use of these drugs.

It would appear, from the information at hand, that, as yet, neither requisite has been obtained.

Questions 4, 5 and 6 related to provisions for the treatment of indigent addicts and the number treated. The replies received indicate that, with few exceptions, the communities heard from were ill-prepared for the care of these cases. In most instances they were treated in general hospitals, insane asylums and county homes; in some localities special temporary provisions were made while in others prisons and dispensaries appeared to be the only available means of relief.

The small number of addicts treated is of interest. Of the 40 cities replying to this question, in only 22 were the correspondents aware that any had received public assistance and in these instances the number cared for fell far short of the number one might have expected to find, even according to the most conservative estimates. This may be due to several causes, over-estimation of our addict population; varying degrees of enforcement of the law and, not least, I am inclined to believe, "leaks" in the law itself. This will be referred to later.

Replying to the query—"Is it your opinion that the Harrison Act meets all the requirements of an act designed to suppress the improper use of opium derivatives and cocaine," 9 replies were "Yes," 28 "No," 8 correspondents were in doubt and 7 uninformed. That 50 per cent. should consider the Act not adapted to its obvious design, is significant, even though we bear in mind that a proportion of criticisms may be ill-founded.

As to the nature of its weak points, 26 specified the exemptions contained in Section 6 of the Act; 8 that physicians were allowed too much latitude; 7 that existing addicts were not provided for (this objection is satisfactorily covered, however, by a ruling of the Commissioner of Internal Revenue under date of May 11). Others suggested that physicians who were themselves addicts needed special control; that copies should be kept of all prescriptions to prevent "raising" (this has occurred in several instances to my knowledge) and that physicians

with "bad records" should be denied registration.

The first criticism given, that of the exemptions of Section 6, seems to be quite well sustained by our knowledge of both the etiology and nature of drug addictions. As Wilbert, whose work evidences a most careful and judicial study of this problem, states—"it may be said that it is not generally realized that the taking of even small doses of opium or morphine at regular intervals for a continued length of time will be more likely to develop the opium habit than the occasional indulgence in larger quantities" and further, after quoting Pettey to the effect that the average person will develop an addiction after 30 days of daily use of opium or one of its alkaloids—"With these several possibilities fairly well established, it would appear to be unfortunate to endorse or even countenance exception clauses in anti-narcotic laws." (Martin I. Wilbert, *Public Health Reports*, Vol. 30, No. 32, p. 2294.)

Granting that the employment of narcotics should be restricted to skilled administration, it is difficult to reconcile the exemptions which permit the sale of preparations containing an amount quite sufficient for physiologic effects, to be sold over the counter at the option of every drug clerk. That the amount of opium or its alkaloids in such preparations is limited, presents merely a distinction of degree, and in view of the actual workings of the law, in this particular as we shall see later, the question of degree, even, is more theoretical than practical.

Considering another alleged weak point in the Harrison Act, that physicians are allowed too much latitude in dispensing these drugs, I believe that there can be little doubt on this point. Paragraph A, Section 2, of the Act provides that physicians shall keep a record of all such drugs dispensed or distributed, etc., except such as may be dispensed or distributed to a patient upon whom such physician shall "personally attend." Under Article 10 of the regulations the phrase "personally attend" is defined as "personally visit," *i. e.*, the physician must be absent from his office. Here is a quite evident "leak," as, in the absence of records of such dispensings, it would be impossible to check the amounts of these drugs used by physicians with their official purchases and amounts dispensed to office patients could easily be accounted for as dispensed during outside visits. That the law has been evaded in this manner is common knowledge.

Again, under date of May 11, a ruling is made stating that where unusual quantities of these drugs are prescribed for the cure of habit that they shall show a decreasing dosage from time to time, as an evidence of good faith on the part of the physician. This is right and proper as far as it goes, but apparently no means are taken to guard against one addict being thus "treated" by several physicians at the same time or by one physician after another. Such evasions are quite simple and have occurred in Jacksonville. Unless more control is exercised over this method of "treating"

cases of drug addiction, many will carry their habits for an indefinite period without serious inconvenience.

Again, it is well established in the bibliography of drug addictions that physicians who are themselves users are notoriously careless in the dispensing of these drugs, yet so far as I am able to discover such physicians may register and pursue their dangerous practice unhindered.

Question 9 related to the sale of paregoric since the passage of the Harrison Act as this preparation has been ruled "exempt" under Section 6. It was stated in 21 replies that the sales of this preparation had increased, in 17 that they had not, while 6 correspondents were doubtful and 9 uninformed. In my own locality the increase has been very marked and many instances of evasion of the intent of the law, through this means, have come under our notice.

Not only may an addict of morphine or other opium derivative be maintained in comparative comfort by the use of paregoric, but it is not at all uncommon to find addicts who have acquired their habit through the continued use of this preparation of opium. By the exercise of a little circumspection, as to the frequency with which they purchase it from any one druggist, such individuals are in nowise affected by the Harrison Act.

Question 10 seeks the same information as the preceding, but with relation to patent medicines, *i. e.*, whether or not their sales had increased since March 1. The replies

received were "Yes," 8, "No," 27, doubtful and uninformed, 15.

Question 11 reads: "Does the general run of legitimate prescriptions of physicians contain less of opium derivatives now than before the enforcement of the Harrison Act?" It was desired to determine, through the replies to this query, whether or not the Act might have had any deterring effect on the careless and unnecessary use of narcotics. The replies would certainly indicate that such had been the case and that the law, in this respect at least, had exerted a powerful suggestion for greater caution in the employment of narcotic drugs. Thirty-eight replied "Yes," 4 "No," while 9 were doubtful or not informed.

In this connection a pharmacist, Mr. W. D. Jones of Jacksonville, went over his prescription files at my request and compared the number of prescriptions containing narcotic drugs for the months of July, 1914 and 1915, before and after the passage of the Harrison Act. In 1914, of 1,650 prescriptions compounded during the month of July at this drug store, 155 or 9.3 percent. contained opium derivatives or cocaine. In 1915, for the month of July, of 1,686 prescriptions compounded, 180 or 10.9 per cent. contained narcotic drugs. No prescriptions for addicts were counted, the figures given representing the normal run of prescriptions both for external and internal use.

In this connection Mr. Jones states it to be his observation that there has been a gradual but constant increase in the use of narcotic drugs for the

last ten years. He considers the increase noted to be about normal and is of the opinion that the Harrison Act has not affected the prescribing of these drugs, as would be indicated from the replies noted above. He further states, as have several other druggists, that immediately after March 1 there was a decrease in the number of prescriptions containing narcotics but that since the medical profession have become more completely familiar with the law that this decrease has ceased to be noticeable. This is a matter for further investigation.

That the Harrison law marks an important period in the story of narcotism in this country and is an evidence of a sorely needed, if belated, awakening on the part of Congress, no one may question. That it will control many of the more flagrant means of distribution of these drugs and that, through the control of interstate traffic especially, it will prove of the utmost assistance in the enforcement of state laws is evident.

On the other hand it would appear, from the foregoing and other examples of weakness which might be added to the list, that it falls far short of adequate control of the situation in many of its phases. In fact about the most that can be said for the law is, to quote from Wilbert again, that "In the Federal anti-narcotic law we have the possibility of an accurate survey of existing conditions in connection with the use and abuse of certain narcotic drugs. The findings, if they can be made a matter of record, will place the

blame for the illicit use of the proscribed drugs where it rightfully belongs and will suggest ways and means for correcting existing abuses."

Dependent as the Act is for any great degree of efficiency on the widespread coöperation of the medical profession, it is much like many state laws which have evidenced their inade-

quacy in the past. Experience has conclusively shown the futility of looking to the medical profession for the solution of the narcotic evil and, until legislators, both state and national, come to realize this fact and take cognizance of it in anti-narcotic enactments, a continuance of the abuses of the past may be expected.



SUMMARY OF STATE LAWS AND RULINGS RELATING TO THE PREVENTION OF BLINDNESS FROM BABIES' SORE EYES.

Blindness from babies' sore eyes (ophthalmia neonatorum) would practically never occur if a prophylactic were used in the eyes of every infant immediately after birth, and if every case of redness, swelling and discharge from the eyes of infants were promptly and adequately treated.

The prevention of blindness from this cause depends entirely on the education of the general public to its dangers, and the use of a prophylactic in every baby's eyes immediately after birth—by the physician, midwife, or nurse in attendance. In addition to widespread publicity, certain legal provisions are necessary to accomplish the desired result. To ascertain how far these provisions exist in the various states, the National Committee for the Prevention of Blindness has made a study of those state laws and regulations which relate to the control of ophthalmia neonatorum. A tabulation of the provisions of these laws is as follows. County and city acts, ordinances and rulings are not included.

This material, briefly summarized, shows the following:

1. The reporting of babies' sore eyes to the local health officer or to a physician is compulsory in 37 states.
2. The reporting law is printed on the birth certificate in 7 states.
3. Local health officers are authorized and required to secure medical attention for uncared-

for cases, or to warn parents of the dangers and advise immediate treatment in 21 states.

4. Births are reported early enough to be of assistance in prevention of blindness work in 11 states.

5. The question as to whether or not precautions were taken against ophthalmia neonatorum is included on the birth certificate in 14 states.

6. Free prophylactic outfits are distributed to physicians and midwives in 16 states.

7. The use of a prophylactic as a routine is compulsory in 15 states, and strongly recommended in an additional 5 states.

8. Popular educational leaflets, relating in whole or in part to prevention of infantile blindness, are distributed by State Departments of Health in 20 states.

The first statutory requirement which should be made by all the states would seem to be compulsory reporting of all cases of babies' sore eyes to the local health officer, with a penalty attached for not doing so. Medical attention could then be provided for all uncared-for cases, while the information secured regarding babies who are attended by physicians, as well as those who are not, would be valuable in showing the frequency with which this disease occurs, and the frequency with which injury results from its neglect.—*Monthly Bulletin, Boston Department of Health.*

THE GRADING OF MILK IN SMALL COMMUNITIES.

LINSLEY R. WILLIAMS, M. D.,

Deputy Commissioner of Health, New York State.

Read before a General Session of the American Public Health Association, Rochester, N. Y., September 7, 1915.

The New York State Health Department last year enacted a Sanitary Code which regulates the sale of milk in every rural community in the state. Doctor Williams tells something of how it has worked.

COMPARATIVELY few small communities in this state, at least, had made much progress toward the grading of milk prior to November a year ago. A large number of these communities, however, had enacted ordinances for improving the sanitary quality of the milk supply. These ordinances were inadequate and in no instances complete, but there were many excellent individual ordinances, such as the prohibition of the sale of dipped milk; the license or issuance of permits to dealers; the definite limits of temperature at which milk may be kept, and so on.

Notwithstanding its limitations and the somewhat arbitrary methods used in scoring, the grading of a milk supply is by far the most satisfactory method of improving the sanitary quality of the milk supply of a community. It brings advantages not only to the consumer but also to the dealer and producer.

For a number of years the three first-class cities in the state of New York, that is, those cities having a population of 175,000 and over, New York, Buffalo and Rochester, have kept the milk supply under a satisfactory system of supervision.

In the seven second-class cities of the state, that is, those cities having a population of 50,000 to 175,000, no systematic work of grading of milk supply was carried out prior to the adoption of the chapter on Milk and Cream of the New York State Sanitary Code in November, 1914, excepting in the city of Syracuse. I again call particular attention, especially to the health officers of this state, not to confuse the excellent milk ordinances adopted in various cities of the state with the definite system of grading milk.

In the smaller cities of the state, those having a population of less than 50,000, of which there are 47, only two made any definite attempt to grade their milk supply prior to the adoption of the Sanitary Code. In the villages and smaller communities it was rather exceptional to find a progressive health officer who had made definite progress in the improvement of his local milk supply.

The effect of the adoption of the Sanitary Code of the State of New York upon milk and cream made a notable advance in the improvement of the milk supply throughout the state of New York. These regulations

contained nothing new to those familiar with the present-day control of milk supplies, and they charged every municipality with the duty of supervising its milk supply through its health officer and his agents. These regulations consist in the inspection and scoring of dairies, and the classification of the milk into grades, according to the dairy score and bacteriological count. The tuberculin test and bacteriological count are required for certified and Grade A milk, and physical examination, excluding tuberculous cattle, for Grade B milk.

It may not be surprising to know that these regulations were openly opposed by a number of producers, grangers and municipal officials, the opposition being based upon the usual argument that such supervision is unconstitutional, unnecessary and expensive and the producer does not receive an adequate price for his milk.

It is our opinion that the opposition really arises from a lack of appreciation of the dangers which may arise from milk and the advantages which come from grading. Unfortunately, many of our citizens can learn only from personal experience. The enforcement of these regulations, especially the proper grading of the milk, is a matter of extreme difficulty for the health officer, especially in smaller communities, because of the lack of public and official support. The health officer in the smaller communities is nearly always a practising physician, and it is a difficult matter for him to insist upon his patients or his political friends or backers living up to the requirements of the milk

code, if any of these persons happen to be producers of milk.

The small community has long experienced one great advantage in its milk supply, and that is that the milk supply is produced locally and reaches the consumer usually within twelve hours of milking time. On the other hand, the small community experiences a marked disadvantage on this very account. The producer takes his milk in cans in a wagon directly to his consumer—usually uniced—and dips it from the can into a receptacle furnished by the consumer. Another difficulty arises in the production of milk in small communities within the city or village limits—the adequate control of a dairy from one to five or more cows owned by a citizen for his personal use, and the disposal, for a part or perhaps all of the year, of his surplus supply. This has raised the question as to whether this small owner is or is not a milk producer. The Department has ruled in these instances that this individual is not a dealer, although what future action may be taken in this regard has not as yet been determined. Two small communities* in the state took definite action in the grading of milk prior to the adoption of the milk code, so they deserve special mention. Full credit, however, should be given many of the communities in the state, too numerous to mention, who during the past five years have markedly improved the quality of their milk supply.

In the village of Saranac Lake, a community of 5,000 inhabitants, a

* Tarrytown also adopted a system of grading prior to November, 1916.

TABLE I.

Name.	Score.			Bacteriological count.		
	1911.	1912.	1913.	1911.	1912.	1913.
Wm. Ryan.....	61	72	96	6,600	22,400	4,933
Judd Kelley.....	69	*	*	21,500	*	*
Chas. Morehouse.....	36	54	83	34,000	97,000	15,250
Harry McConnell.....	69	64	76	36,000	36,000	12,833
I. R. Works.....	66	65	85	38,000	105,000	20,234
Meadowbrook Farm.....	86	87	95	50,300	50,300	5,100
Wm. Betters.....	57	49	82	55,000	101,000	38,833
John Tierney.....	47	21	81	102,000	175,000	30,767
T. Frasher.....	38	30	81	132,000	229,000	29,000
L. W. Durgan.....	60	65	95	240,000	451,000	32,780
A. H. McKillip.....	68	33	87	39,000	57,000	14,300
Hugh Morgan.....	52	23	91	40,000	85,000	18,733
E. Curran.....	50	70	92	73,000	137,000	21,366
Wm. Kelley.....	27	32	*	98,000	282,000	*
J. H. Morgan.....	33	24	50	108,000	267,000	249,467
Oscar Manning.....	30	20	*	240,000	880,000	*
Geo. Sweeney.....	†	15	*	502,000	570,000	*

* Out of business.

† No score made.

definite advance was made in the improvement of its milk supply through the efforts of one of the bacteriologists of the Saranac Lake Laboratory. At the beginning of the summer of 1911, bacterial counts were made of the milk of 17 dairies, and the dairies were scored at the same time. No definite effort was made to grade this milk until after the preliminary work had been done. The bacteriologist who made the counts and the scores also had personal interviews with each dealer and pointed out to him the reasons why he should make an effort to improve his supply. The counts and scores made in the Summers of 1911, 1912 and 1913 are given in the above table. (See Table I.)

You will note that several of the

dealers who had poor scores and high bacterial counts went out of business, and that a number made marked improvement, both in the score and bacterial counts of their milk.

You will note that the Meadowbrook Farm Company had, in August 1911, a score of 86 with 50,000 bacteria; in August 1912, a score of 87 with 50,000 bacteria; August 1913, a score of 95 with 5,000 bacteria. Morehouse, in August 1911, had a score of 36 with 34,000 bacteria; August 1912, a score of 54 with 97,000 bacteria; August 1913, a score of 83 with 15,000 bacteria. Durgan, in August 1911, had a score of 60 with 240,000 bacteria; August 1912, a score of 65 with 451,000 bacteria; August 1913, a score of 95

with 32,000 bacteria. Wm. Kelly, in August 1911, had a score of 27 with 98,000 bacteria; August 1912, a score of 32 with 282,000 bacteria; in 1913 he went out of business.

As a result of this preliminary work, and through the continuous efforts of the health officer of Saranac Lake, Dr. C. C. Trembley, and the bacteriologist, Dr. John A. Smith, now Sanitary Supervisor in the State Department of Health for the Adirondack district, and Mr. C. S. Thurston, the Board of Health of Saranac Lake Village adopted milk ordinances on April 15, 1913, over a year before the milk chapter of the Sanitary Code of the state was adopted. This ordinance graded the milk to be sold in the village of Saranac Lake into three grades very similar to that adopted later by the State Department of Health.

That such work was possible for a small village is no doubt due in part to the fact that a number of the inhabitants of Saranac Lake, through their experience with tuberculosis, have become interested in the public health propaganda and have lent their support and coöperation toward the improvement of conditions within the village. It would also seem that such work could not have been accomplished without the use of a laboratory, which demonstrated again that bacterial counts are usually in proportion to the dairy score.

In the year 1909 the board of health of the city of Ithaca, frequently spoken of in this state as the model board of health (the board of health of Ithaca consists of Mayor Thomas Tree, president; Mr. W. O. Kerr, secretary and

registrar; Dr. H. H. Crum, health officer. Other members are as follows: H. B. Besemer, Prof. W. A. Stocking, Prof. V. A. Moore, Fred D. Van Order, H. L. Stewart and John Collins) undertook steps to improve the milk supply. The milk was graded on the basis of bacteriological counts and on the standard score-card. On the bacteriological standard, excellent equals 10,000 or under; good equals over 10,000 and under 50,000; fair equals over 50,000 and under 100,000; poor equals 100,000 plus.

Two noteworthy features of the supervision of the milk supply in Ithaca consist of a physical examination of all the dairy cattle supplying milk to the city. No definite effort has been made to have the herds tuberculin tested, three only having been so tested, but many undesirable cattle have been eliminated by means of physical examination. The other important feature consists in the publication of the dairies, giving the bacteriological count and grading for that month. This is published as a bulletin for the use of the consumer. The following table shows the number of dairies and their scores:

Number.	Per cent.	Score.
29	23.77	75
55	45.09	60-75
34	27.87	40-60
4	3.27	40-

The average bacterial counts for the year 1915 of 22 dairies show that five dairies have had less than 10,000 bacteria, eight had a count of 10,000 to 50,000; five had a count of 50 to 100,000; and four had a count of over

100,000, of which 445,000 was the highest.

The milk supply of Ithaca being in such a satisfactory condition, this municipality was allowed to continue to maintain its new system of grading, in accordance with Regulation 13, Chapter III of the New York State Sanitary Code. The character and excellence of this milk supply cannot be passed over without pointing out the fact that the Dairy Division of Cornell University and the Cornell School of Veterinary Medicine have played an important part in the improvement of this milk supply, and that, without this stimulus and the additional advantage of the Cornell University Laboratory, the bacteriological counts would not have been made, nor could a bacteriological standard have been put into effect.

In Rockland County a number of municipalities have contracted with a local laboratory to examine and score the dairies, and a marked improvement of the scores and bacteriological counts made has been noted in these localities. Nine dairy farms scored in West Haverstraw at the beginning of the year gave an average of 46 points. These same dairies were recently scored, and averaged 59.8 points. Twenty-five dairies supplying the village of Haverstraw scored at the beginning of the year, averaged 48.5 points. At the recent scoring they averaged 61.5 points. Eighteen dairies in Congers scored at the beginning of the year, averaged 54 points; at the recent scoring the average was 60 points. Twenty-four dairies in Nyack

scored at the beginning of the year, averaged 48 points; at the present scoring the average was 60 points. Nine dairies at Piermont scored, at the beginning of the year, averaged 56.5 points; at the recent scoring 70 points. Six dairies at Stony Point, scored at the beginning of the year, averaged 45 points; at the recent scoring 64 points. Thus we have a total of 90 dairies averaging at the beginning of the scoring 49.5 points, and at the recent scoring averaging 62.5 points.

This satisfactory work is limited, and conditions in other small communities are far behind this in grading of the milk supply. For example, a small city near Albany has inspected several dairies and scored them, but no definite grading of the milk has been done, nor has anything definite been done other than to grant permits for the sale of milk.

In this city of about 11,000 population, the milk is supplied by ten dealers, by two large companies who sell bottled milk in small amounts, and by three other dealers who sell most of their supply in the city of Albany. The score of these ten dairies, giving each dairy considerable leeway on the score, is as follows:

Name.	Score.	Name.	Score.
C. H.	23.5	J. R.	45
M. O.	63	C. G.	40
J. V. E.	64.5	F. B.	75
R. H.	67.5	C. C.	52
J. H.	62	C. W.	51
G. W.	79	J. M.	80.5
A. R.	42.5	L. C.	71
J. M.	80.5	A. P.	66.5
J. S.	72.5	J. T.	65.5

These scores were made by a representative of the State Department of Health, and are quite a little lower than the scores made by the local health officers. This city receives from these dairies 558 gallons of milk a day. All this milk is dipped milk and all is Grade C. A considerable amount is sold from grocery stores and not under the best sanitary conditions. The small amount of bottled milk is of Grade A pasteurized and Grade B, respectively. None of the milk sold in this city is labeled according to grade, with the exception of that of the bottled milk, which is properly labeled.

A number of other small cities and villages have commenced to grade their milk supply, and the health officers are making honest efforts to improve the situation. The problem, theoretically, is a simple one. The health officer of a village could inspect, score and grade all the dairies in his district within a month's time. The practical difficulty consists in getting the people to realize the importance of grading the milk supply, and to have them demand that their milk be labeled Grade A, B or C. The scoring of dairies and the issuance of permits has, to a large extent, been done, but the labeling of cans and bottles is as yet far from being satisfactorily performed.

Through the kindness of the New York Milk Committee, a table was prepared for me several months ago, giving the milk ordinances for a number of cities with a population from 1 to 10,000; 10 to 50,000; 50 to 100,000; and 100,000 and over. For this excel-

lent tabulation I desire now to express to the Committee my thanks.

In the cities of Bellevue, Ohio, Ft. Scott, Kansas, Albuquerque, New Mexico, Warren, Pa., Vallejo, Cal., Lake Charles, La., Southbridge, Mass., Holland, Mich., Long Branch, N. J., Piqua, Ohio, and Cairo, Ill., having a population of from 5,000 to 14,000, all have ordinances controlling the sale of milk. None of these ordinances, however, require any grading or classification of the milk. Long Branch alone requires a minimum dairy score and none require labels.

Of these eleven cities, four require tuberculin test, two of which also require physical examination of the cattle, and four more require physical examination. Seven, however, require bacteriological standards, Holland, Mich., having a minimum standard of 200,000; Cairo, Ill., 300,000; Bellevue, Ohio, Albuquerque, N. M., Southbridge, Mass., and Piqua, Ohio, 500,000. Long Branch has a minimum standard of 1,000,000 before pasteurization and 50,000 after pasteurization.

The sale of dipped milk is prohibited in Piqua, Long Branch and Holland. In no instance is the producer required to have a permit, but in all but three instances the dealer is required to have a permit. Seven have a minimum temperature standard—60 in three instances; 50 in four instances. Four have no temperature standard.

The advantages of grading milk are great, as has already been pointed out to you today. The actual amount of work to grade a supply is not so great, nor is it expensive. Opposition

is naturally made and can only be overcome by education. The health officer must appreciate the advantages to be obtained and if personal conferences with the milk dealers are held, at which representatives of the State Departments of Health or Agriculture, or from the Dairy Division of the Federal Department of Agriculture attend, considerable progress can be made in dispelling the fears of the producers.

In this state an effort has been made, through various members of the Department, to call together meetings of local dealers and advise them the meaning of the regulations which require the grading of milk. This method has been unusually successful in a number of instances, and milk has been graded in a number of our small communities.

The two small communities selected and spoken of at some length in this

paper were chosen because of the work which had been done toward grading the supply before the adoption of the State Milk Code. Progress is being made in almost every locality, and the Department feels encouraged with the way in which the health officers have tackled this problem, which to a large number of them was wholly a new one.

It would not be possible to mention all the incorporated villages and smaller cities which are now actively carrying on a campaign for the grading of their milk under the efficient direction of the health officer, nor would it be practicable to give a detailed statement of the work of grading milk throughout the state until November of this year, which completes the first year of work after the adoption of the State Milk Code by the Public Health Council.



HEALTH INSURANCE IN THE PREVENTION OF TUBERCULOSIS.

Nearly fifteen hundred anti-tuberculosis associations in almost every part of the United States will be asked to participate in a campaign for health insurance legislation by the American Association of Labor Legislation, according to an announcement made recently from the headquarters of the National Association for the Study and Prevention of Tuberculosis. Bills asking for health insurance legislation will be introduced in more than twenty states during the coming fall and winter and the support of the anti-tuberculosis associations and other public health organizations will be urged for these bills.

The anti-tuberculosis associations are counting upon health insurance as an aid in controlling the spread of tuberculosis, because it will provide machinery first of all to discover the cases that cannot now be found by ordinary methods in vogue, and secondly it will help to secure the much needed medical care in hospitals and sanatoria that will check the ravages of this disease. But more than these, the anti-tuberculosis

workers are looking to health insurance as an aid in promoting periodic physical examinations in all industries, which the National Association for the Study and Prevention of Tuberculosis believes would be one of the greatest preventive measures that can be introduced in this country.

At the present time, tuberculosis is the greatest single cause of death and it is also the most difficult of all diseases to detect. Under a system of health insurance, which would necessarily presuppose regular examinations at periodic intervals of all workers, both the employer and the employee, as well as the state, would be interested to see that this disease was discovered before it had developed too far.

The proposed bills provide for participation of the worker, the employer, and the state in the insurance fund and also provides for the adaptation of the scheme to already existing benefit agencies under state supervision. The health insurance laws will cover every worker earning \$100 a month or less.

THE RÔLE PLAYED BY THE PUBLIC HEALTH NURSE IN THE CONTROL OF COMMUNICABLE DISEASES.

CHARLES J. HASTINGS, M. D.,
Medical Officer of Health, Toronto, Canada.

Read before the General Session, American Public Health Association, September 10, 1916.

WHEN I was asked to present this phase of the problem, I was prompted to comply with the request, in view of the fact that probably nine-tenths of the efficiency of all public health work is educational. We have heard a good deal about printer's ink and its value in regard to public health administration and public health education, but while we all appreciate the value of education through this channel, yet, we also realize the fact that there is a limited portion of the population of any large urban centre that can be reached and educated through the medium of printer's ink.

In the first place there are tens of thousands of the people in all large urban centres such as New York, Philadelphia, Chicago, and even Toronto, who cannot read. There are still thousands of others who can read but do not read and tens of thousands who read but do not think. Therefore, there must be some other means by which we can get in touch with these people for obviously these are the citizens that require education the most. We must get nearer to them; we must get into their homes, and this can best be accomplished through the medium of the public health nurse.

The qualifications of a public health nurse, in addition to her training in a well-recognized school for the training of nurses and the holding of a diploma therefrom, require her to be a tuberculosis nurse; a child welfare nurse; a school nurse; a social agent; and to be trained in hygiene and sanitation. The training in social service must be of such a character as to make her an efficient social service agent. In fact, she must be the home-maker, caring for the race from the prenatal state until it passes on to the next cycle of existence. Heretofore children have been neglected until they enter school, before which, oftentimes, irreparable damage has been done.

Any efficient campaign against communicable disease must be directed along two distinct lines: First, the preventing of germs from gaining access to the body; second, the building up and maintaining of the resisting powers of the body. That this may be effectively carried out, the public requires to be educated, for upon the degree of efficiency of this education depends largely the permanency of our work in preventive medicine. The knowledge of the sources of disease, and the various ways and means by which it is transmitted from one person to another for years has remained, for the most part, within the precincts of our universities and laboratories. This knowledge must be democratized or translated into language that can be assimilated by the housewife in the humblest home and by the man on the street.

Obviously, this can best be accomplished by the public health nurse—she having already won the confidence of the home. By rendering a service in it she can secure a hearing that no one else could. With her knowledge of the haunts and habits of disease-producing germs and of how they are transmitted from one person to another, in conversation with the mother she can convey to her this information in a manner that will be acceptable to her and will be properly understood by her. At the same time the nurse can explain the dangers of the mild cases that are unrecognized and, therefore, unreported, and also of the purposely concealed cases, assuring the people that the object of the Department of Health is not to create trouble for them, but to safeguard them against the ravages of these diseases. She can explain to them that prevention is much more economical than cure and can thereby secure a better reporting of cases and consequently a more efficient quarantine.

Probably the best illustration we have of the value of the public health nurse in the control of communicable disease is the work that has been accomplished by her in the campaign against tuberculosis. Take for instance my own city. In 1911 Toronto had 59 patients in the hospital for advanced cases of tuberculosis and 7 in the Muskoka Hospital for the earlier cases. These two sanatoria now have 225 and 350 cases respectively. This is largely due to the fact that, in addition to our having legislation in force requiring the reporting of all cases of tuberculosis, our nurses, by attending the various tuberculosis clinics and following the cases to the homes, have been brought in contact with and have heard of numbers of other cases. The cases reported are not more than one-half as many as those that have been hunted up and discovered by the nurses in the field work. They attend the tuberculosis clinics; follow the cases to the home; make careful investigation of home conditions and advise the mother in regard to the danger of transmission of tuberculosis from one member of the family to another, and how to prevent or overcome this danger. At the same time they emphasize the fact that the same precautions and the same instructions apply to all communicable diseases. Moreover they make observations in regard to the social conditions in the home. The father is probably out of work—that means a decrease in the revenue of the home by probably one-half. Probably the mother has to become the sole bread-winner. In addition to the decrease in revenue, this means the depriving of the young children in the home of the mother's care, which probably means that the mother has to wean her baby. This deprivation oftentimes entails irreparable damage.

These conditions when found by our nurses are reported to the proper social agencies for correction. The Department of Public Health does not give financial help, but coöperates with the social agencies which can do the constructive work in the home. Material relief as part of a constructive plan is frequently given by the social agency. The Department is concerning itself not only with preventing the transmission of disease, but also with maintaining normal conditions of living.

At present our nurses have 7000 homes under supervision. The opportunities for the nurses to reach the homes as welcome visitors are constantly increasing. One of the most valuable opportunities is that afforded by the hospitals. Gradually the follow-up work has been undertaken for those hospitals which have not organized social service departments of their own. The individual social problem is referred by the Department to the local social agency and by united efforts the patient, when discharged from the hospital, is readjusted to his environment.

It must be clear to all of us that if we are going to efficiently administer the principles of preventive medicine we must get back to the social problems of the home, and we must see that the revenue in the home is such as to make it possible for these people to be properly and sufficiently nourished and properly housed.

The public health nurse should be equipped in personality and training to teach the sources and modes of infection and to secure in her neighborhood the conditions of living which establish physical resistance to disease. As a teacher she is welcome because she has become known in the homes in their times of need and having shared the experiences of the home and of the neighborhood, she teaches in the language of their experience.

WHAT OHIO IS DOING TO CONSERVE LIFE IN THE INDUSTRIES.

VICTOR T. NOONAN,

Director of Safety, The Industrial Commission of Ohio.

Read before the Industrial Hygiene Section, American Public Health Association, Rochester, N. Y.,
September 10, 1915.

THE State Industrial Commission of Ohio, which handles state compensation for workmen killed or injured in industrial occupations, is carrying on an aggressive educational campaign to conserve the lives and limbs of the industrial workers of the state. It was realized that the mere enforcement of state factory laws and the guarding of machinery would not put an end to the tremendous number of accidents occurring each year in the state, as it was found that the human factor—the man himself, was responsible for at least 50 per cent. of the accidents. So it was deemed necessary that the man himself, the employer, the superintendent, the foreman and the workman should be educated to the important fact that the human body is the most perfect, the most wonderful of all machines, and that this human machine must be cared for and protected first.

Just a year ago this educational campaign was inaugurated. In that time I have made more than five hundred talks in as many factories throughout the state. In these talks the value of a human life, the wonders of the human body, the wonderful power of sight and touch and hearing, the marvelous power and ability of the human

hands have been brought home to the workman. Motion pictures have also been used with good effect. The result of this direct personal appeal to the workmen has been very great, and in all the workshops where this educational work has been carried on, both employers and workmen have since shown much enthusiasm and coöperation in the prevention of needless accidents. Where possible the children of the workmen in the schools have also been enlisted in Ohio's efforts to conserve the lives and limbs of its great army of industrial workers.

Ohio was the first state in the country to inaugurate an industrial safety exposition, the first annual exposition being held last January at Columbus. One hundred and fifty companies and corporations from every section of the country, including the railroads and steel corporations, had exhibits, illustrating not only the best methods of accident prevention, but also industrial hygiene and sanitation. This exposition was not commercial in any sense, but highly educational. The second annual safety exposition of Ohio will be held in Central Armory in Cleveland, January 22 to 30, 1916, when at least two hundred and fifty companies will be represented with exhibits as well as many

other states and public health departments. It will be formally opened by the governor of the state.

Under direction of the Industrial Commission of Ohio, new laws for factories and workshops are now being formulated by committees of employers and workmen. Under the old plan such laws were made by the legislators; under the new system, the employer and the workman become the legislators of their own factory laws. The new codes now ready for the approval of the Industrial Commission will give increased protection from mechanical dangers, better ventilation, greater light, purer air and healthier sanitary conditions. In a word, the workingman and the workingwoman in Ohio stand today on the threshold of healthier and happier working conditions and with a new and higher appreciation of the value of their lives and limbs.

■ Civilization is judged by its regard for humanity. In our modern American civilization today, there is a new

spirit—the spirit of prevention. You ladies and gentlemen who are here today from many sections of this great continent know what that spirit is. It is the spirit of love, a spirit filled with mercy, kindness, sympathy, tenderness; it is that spirit which fills your hearts, which gives you courage and optimism in your efforts to prevent disease, to make the sick well, to save life and to promote happiness.

The value of a human life is not to be measured in dollars and cents; the value of life is measured in the joy of fatherhood and motherhood; the value of life is measured in the smile of the innocent babe, so likewise is it measured when death takes the one that is loved. The value of life is measured in laughter and tears, in joy and suffering, in gladness, affection, friendship and family ties and in all the sweet memories that lie hidden in every heart. When life is valued in this way, your work and mine will become a song which will reëcho through the corridors of time.



PUBLIC HEALTH PURCHASABLE.

A committee of the American Association of Labor Legislation has estimated that each one of the 30,000,000 wage earners in the United States annually loses nine days through sickness, as an average. This is a total of 270,000,000 days lost to production.

If only one individual could be the goat, and were willing to gather into his own tissues all the pain, anguish and hardship which these figures represent, that individual would be the greatest benefactor imaginable and would be at the job over 750,000 years.

The financial loss to the worker for medical care in these 270,000,000 sick days has been put at \$6 per capita.

The proper remedy lies not so much in sickness insurance, for somebody has to pay that, but in improved methods and better conditions of living, so that each of the 30,000,000 may cut down the sick days to a minimum.

This can come only through more uniform intelligence regarding the foes of health, more interest in the means for fighting them and better actual practice of the laws when they are known.

If the 2,500,000 people in Chicago would resolve to tax themselves at a total average annual rate of \$1 each, for maintaining community health through the effort of their department of health, they would go a long way toward saving the \$6 per capita loss sustained by the wage earning class of the community, which is the most important part of that community. This is a good business proposition.

The city of Buffalo does better; it devotes \$1.11 per capita annually to its health conservation. Chicago had only 37c per capita during 1915 for this purpose. Is it possible that Buffalo is more intelligent, more public-spirited and more progressive and up-to-date than Chicago with its motto, "I WILL"?

SCARLET FEVER DURING 1915 IN PHILADELPHIA.*

MAURICE OSTHEIMER, M. D.,
Acting Assistant Diagnostician, Philadelphia Bureau of Health.

DURING 1915, 1,072 cases of scarlet fever were reported in Philadelphia, exactly one hundred more than half the number reported during 1914 (1,944); and less than a third as many cases as were reported during 1913 (3,400). This is a morbidity-rate of 63.7 per 100,000, as compared with 117 in 1914 and 208 in 1913. (See Chart I.)

The lowest number of cases was reported during August, only 29 cases; the highest number during December, 147 cases. January, 1915, had only 118 cases as compared with 286 in

January, 1914, and 198 in January, 1916. (See chart II.)

The sex of the 1,072 cases reported was male, 529, of whom 513 were boys; and female, 543, of whom 501 were girls. Thus only 58 adults contracted scarlet fever during 1915.

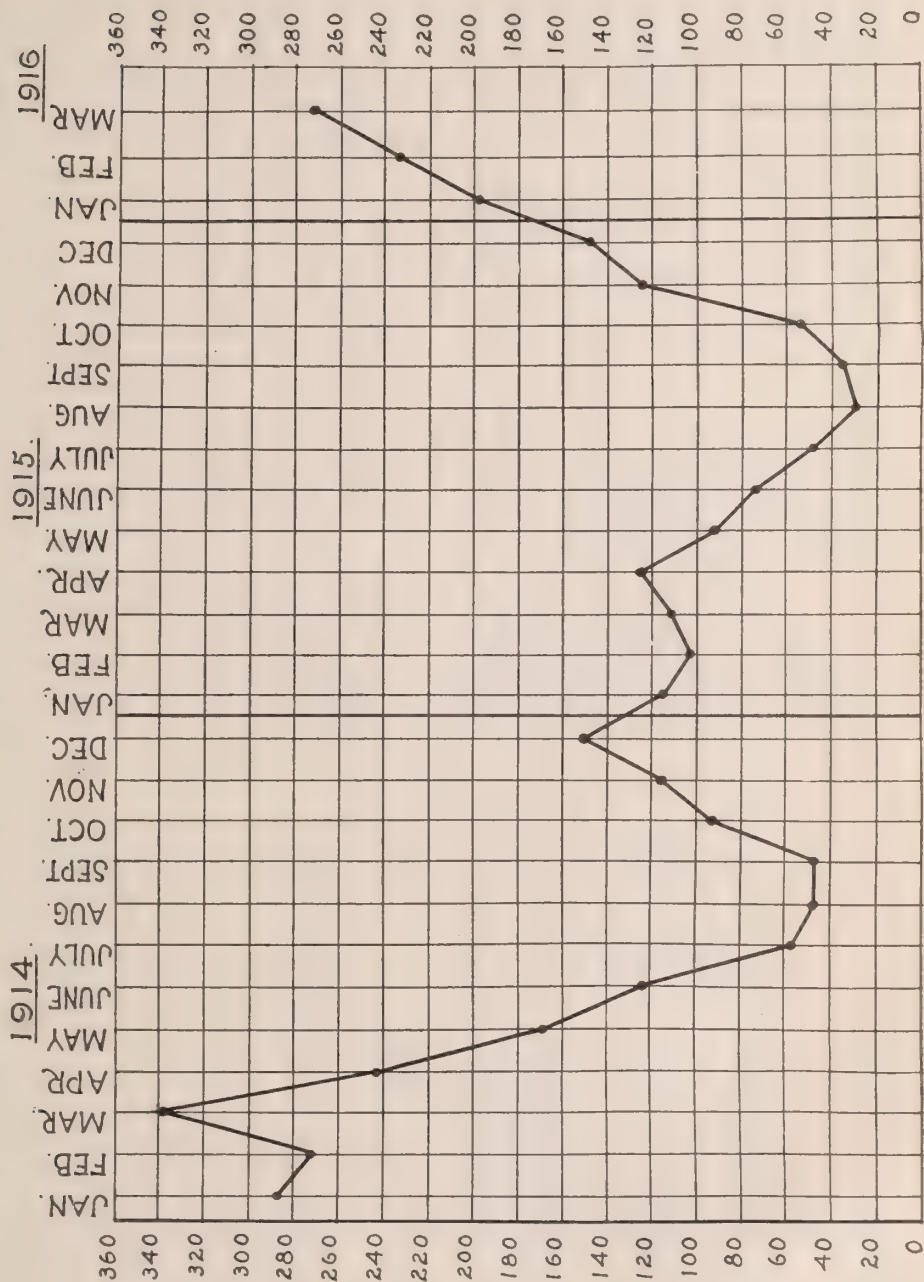
These figures this year are the lowest since 1900, when what we now consider accurate statistics were begun. The figures coming nearest to these are found in 1906, 1,696 cases, and in 1907, 1,893 cases. The highest number of cases in any year was 4,188 in 1903, with

CHART I.
SCARLET FEVER.

	Cases.							
	1908.	1909.	1910	1911.	1912.	1913.	1914.	1915.
Jan.....	5 wks. 299	4 274	4 202	4 203	4 114	4 431	286	118
Feb.....	4 wks. 260	4 277	4 166	4 180	4 160	4 442	273	102
Mar.....	4 wks. 325	4 306	4 148	4 180	5 337	5 559	339	111
1st qtr.....	884	857	516	563	611	1,432	898	331
April.....	4 wks. 270	4 287	5 214	5 250	4 311	4 351	242	142
May.....	5 wks. 278	5 309	4 185	4 287	4 280	4 406	171	92
June.....	4 wks. 207	4 199	4 185	5 173	5 265	5 215	118	71
2d qtr.....	755	795	584	710	856	972	531	305
6 mos.....	1,639	1,652	1,100	1,273	1,467	2,404	1,429	636
July.....	4 wks. 87	5 129	5 94	4 89	4 115	4 90	58	48
Aug.....	5 wks. 89	4 70	4 63	4 83	5 124	5 76	48	29
Sept.....	4 wks. 110	4 98	4 71	5 107	4 111	4 87	48	37
3d qtr.....	286	297	228	279	350	253	154	114
	1,925	1,949	1,328	1,552	1,817	2,657	1,583	750
Oct.....	5 wks. 233	5 186	5 171	4 93	4 187	4 179	94	54
Nov.....	4 wks. 243	4 170	4 197	4 120	5 375	5 298	116	121
Dec.....	5 wks. 250	5 284	5 229	5 163	4 493	30 d's 266	151	147
4th qtr.....	726	640	597	376	1,055	743	361	322
Year.....	2,651	2,589	1,925	1,928	2,872	3,400	1,944	1,072
Rate, 100,000...	177	170	124	122	179	208	117	63.7
	Deaths.							
	1908.	1909.	1910	1911.	1912.	1913.	1914.	1915.
Deaths.....	181	133	135	179	113	162	129	26
Rate, 100,000...	12.0	8.7	8.7	11.3	7.0	9.9	7.8	1.5
Case death-rate...	6.8	5.1	7.0	9.3	3.9	4.8	6.6	2.4

*This paper was read before the Philadelphia Pediatric Society, Tuesday evening, March 14, 1916.

CHART #II SCARLET FEVER BY MONTHS.



3,756 in 1901; 3,740 in 1904 and 3,400 in 1913. (See Chart III.)

The lowest number of deaths from scarlet fever on record also occurred during 1915, only 26 in the entire city, a case death-rate of 2.4 per cent., as compared with 2.9 per cent. in 1905 and 3.3 per cent. in 1906. The highest case death-rate occurred in 1911, 9.2 per cent. The greatest number of deaths recorded was 220 in 1901, with 201 in 1904. The death-rate per 100,000 was but 1.5 in 1915, as compared with 7 in 1912, 7.8 in 1914 and 12 in 1908. (See Chart III.)

The 1,072 cases were reported as follows:

	Cases	Per cent.
On the day of onset in	305	28.5
On the second day of illness in	285	26.6
On the third day of illness in	210	19.6
On the fourth day of illness in	105	9.8
On the fifth day of illness in	64	6.0
From the sixth to tenth days in	51	4.7
From the eleventh to twentieth days in	52	4.8

It is interesting to note that 74.6 per cent. (800 cases) were reported to the Bureau of Health within three days from their onset, as compared with 73.9 per cent. in 1914; and within five days from the onset of the disease 90.4 per

cent. of cases (969 cases) had been reported, as compared with 89.8 per cent. in 1914. This prompt reporting of cases, with the early isolation then possible, has greatly helped to diminish scarlet fever in the city. Yet we should not overlook the fact that the case-incidence of scarlet fever varies from year to year, even under the best conditions.

In 112 cases (10.4 per cent.) the patient was well isolated with a trained nurse in attendance; in 279 cases (26.1 per cent.) one member of the family nursed the patient while another acted as housekeeper; but in 681 cases (63.5 per cent.) the same person acted as nurse and housekeeper. Naturally the last figures include most of the patients who were removed, later, to the Philadelphia Hospital for Contagious Diseases.

Girard College furnished the only institutional epidemic during the year, 31 mild cases having developed during two summer months in a building containing about 300 boys aged from 7 to 10 years. There also occurred two small school epidemics, one in a public school (twelve cases in 6 weeks); the other in a parochial school (ten cases in 9 weeks). No cases were traced to milk infection during 1915, which would tend to prove that our milk supply is really well pasteurized.

CHART III.
SCARLET FEVER.

	Cases.			Per cent. cases treated in hospital	Deaths.			Per cent. fatal.		
	Total reported	Treated in hospital. Number admitted during year.	Treated at home.		Total.	Hospital cases admitted during year.	Home.	Total.	Hospital cases admitted during year.	Home.
1900	2,813	717	2,096	25.5	163	94	69	5.8	13.1	3.3
1901	3,756	1,115	2,641	29.7	220	123	97	5.9	11.0	3.7
1902	3,161	673	2,488	21.3	143	56	87	4.5	8.3	3.5
1903	4,188	927	3,261	22.1	189	98	91	4.5	10.6	2.8
1904	3,740	764	2,976	20.4	201	97	104	5.4	12.7	3.5
1905	1,992	586	1,406	29.4	57	37	20	2.9	6.3	1.4
1906	1,696	557	1,139	32.8	56	42	14	3.3	7.5	1.2
1907	1,893	817	1,076	43.2	100	69	31	5.3	8.5	2.9
1908	2,651	1,195	1,456	45.1	181	130	51	6.8	10.9	3.5
1909	2,589	1,574	1,015	60.9	133	112	21	5.2	7.1	3.4
1910	1,925	1,219	706	63.3	135	121	14	7.0	9.9	5.6
1911	1,928	1,245	683	64.6	179	115	64	9.2	9.2	9.4
1912	2,872	1,917	955	66.8	113	87	26	3.94	4.5	2.7
1913	3,400	1,742	1,658	51.3	162	103	59	4.8	5.9	3.6
1914	1,944	1,165	779	59.9	129	77	52	6.6	6.6	6.7
1915	1,072	625	447	58.3	26	21	5	2.4	3.3	1.1

The greatest number of cases occurred in the 39th ward (74 cases), in the extreme southeastern part of the city; with 60 cases in the first ward, just north of the 39th ward; 57 cases in the 42d ward; 53 cases in the 15th ward; and 50 cases in the 22d ward. The rate per 100,000 of population was greatest in the 42d ward (241), with 163 in the 48th ward, 140 in the 47th ward, and 136 in the 39th ward. The 25th, 41st, 42d and 48th wards, in which the population is least dense, stand No. 45, 43, 3 and 17 in the list of frequency of occurrence of scarlet fever; while the 42d ward leads in the rate per 100,000, with the 48th ward next. In both of these wards the density of population is low. The third ward, in which the density of population is greatest, stands No. 37 in the list of frequency of scarlet fever. (See Chart IV.)

The lowest number of cases occurred in the 9th ward, 0; in the 6th ward, 1 case; and in the 10th ward 2 cases; with the lowest rate per 100,000, also, 0 in the 9th ward, 10 in the 10th ward and 16 in the 6th ward.

When the city is divided into six districts, Central, West, South and North Philadelphia, Germantown and Frankford, the local distribution of scarlet fever becomes interesting. Central Philadelphia, with six wards, had 27 cases, an average of $4\frac{1}{2}$ cases per ward; Frankford, with 3 wards, had 21 cases, an average of 7 cases per ward; North Philadelphia, with 21 wards, had 439 cases, an average of 21 per ward; West Philadelphia, with 6 wards, had 160 cases, averaging 27 per ward; South Philadelphia, with 9 very congested wards, had 282 cases, averaging 31 per ward; and Germantown, with 3 wards not densely populated, had 143 cases, or an average of 48 per ward. (See Chart V.)

Although the officials of the Bureau of Health are hard at work trying to trace the source of contagion in each case reported, it seems almost impossible to find the definite origin of the disease in more than about one third of all cases. Each year, however, brings to light more cases of contact. During 1915 there was known contact in school in 100 instances (9.3 per cent.), as compared with 6.6 per cent. in 1914. Other contact, as in homes, moving picture theatres, playgrounds, etc., was discovered in 117 instances (10.9 per cent.).

When the primary case was treated at home,

117 secondary cases (10.9 per cent.) occurred later than 24 hours but within one month after the first case, as compared with 7.9 per cent. in 1914 and 5.7 per cent. in 1913. But only 31 secondary cases (2.9 per cent.) occurred in houses from which a case had been removed to the Philadelphia Hospital for Contagious Diseases, later than 24 hours but within one month after the first case, as compared with 3.9 per cent. in 1914 and 5.9 per cent. in 1913. These figures show a continued increase in secondary cases when the primary case remained at home, and a continued decrease when the primary case had been removed to the Philadelphia Hospital for Contagious Diseases. It is natural to conclude from this that even more cases of scarlet fever ought to be removed to the hospital for treatment.

New cases probably due to the return home of cases discharged from the Philadelphia Hospital for Contagious Diseases, the so-called "hospital return" cases, occurred in 33 instances (3.1 per cent.) as compared with 2.6 per cent. in 1914 and 2.4 per cent. in 1913. A note of warning might be inserted here against allowing children returning from the hospital, or from isolation, after scarlet fever, to mingle intimately with other children for some weeks. It is so easy for these children to become contagious again, if they catch cold. Whenever possible, such children should get away for a change of air.

Late secondary cases, those occurring several months after the primary case, occurred in only 3 instances (0.28 per cent.) as compared with 0.4 per cent. in 1914 and 0.3 per cent. in 1913. Adding together all the secondary cases gives a total of 184 cases (17.2 per cent.) as compared with 14.9 per cent. in 1914 and 14.3 per cent. in 1913. When the cases in which there was known contact are added to the secondary cases, we have a total of 401 cases in which the origin was discovered, 37.4 per cent., as compared with 32.8 per cent. in 1914. This increase proves that better work is being done each year in discovering the source of contagion in scarlet fever.

The number of cases of scarlet fever removed to the hospital for treatment during the past 15 years varied greatly each year. The greatest number of cases removed to the hospital in any one year was in 1912, when 1,917 cases went (66.8 per cent.), the lowest number went

CHART IV.

DISTRIBUTION OF SCARLET FEVER IN
RELATION TO DENSITY OF POPU-
LATION, ARRANGED BY WARDS.
1915.

Ward.	Population per acre.	Cases.	Rate per 100,000.	Number in order of frequency.
1....	107	60	126	2
2....	143	22	54	21
3....	210	7	27	37
4....	152	4	18	42
5....	83	3	18	44
6....	31	1	16	47
7....	98	11	40	31
8....	50	10	72	32
9....	20	0	0	48
10....	85	2	10	46
11....	86	5	43	40
12....	122	7	46	36
13....	119	17	86	23
14....	128	5	26	41
15....	70	53	112	4
16....	90	8	49	34
17....	109	6	34	39
18....	65	13	48	30
19....	118	20	38	22
20....	97	36	79	11
21....	7.8	36	102	10
22....	10	50	71	5
23....	16	16	50	27
24....	21	19	35	24
25....	60	16	38	28
26....	61	48	87	6
27....	49	15	62	29
28....	71	30	61	15
29....	58	31	103	14
30....	88	8	27	35
31....	68	7	23	38
32....	72	24	60	18
33....	27	29	56	16
34....	18	35	71	12
35....	0.5	2	19	45
36....	53	33	73	13
37....	69	17	74	25
38....	19	17	35	26
39....	18	74	136	1
40....	8	23	55	19
41....	3.9	3	19	43
42....	4	57	241	3
43....	46	46	106	8
44....	52	46	118	7
45....	14	10	38	33
46....	22	22	57	20
47....	73	42	140	9
48....	5.2	26	163	17

in 1905, 586 cases, 29.4 per cent. During 1915, 625 cases were removed to the Philadelphia Hospital for Contagious Diseases, 58.3 per cent.

On the other hand, the greatest number of cases remaining under treatment at home in any one year was 3,261 cases in 1903, 77.9 per cent., while the highest per cent. of cases treated at home in any one year was 78.7 per cent. in 1902. The lowest number of cases treated at home occurred in 1915, only 447 cases, 41.7 per cent.

The hospital death-rate was greatest in 1908, 130 deaths, 10.9 per cent., and lowest in 1915, 21 deaths, 3.3 per cent., which was the lowest per cent. of deaths in the hospital. The highest per cent. of deaths in the hospital was noted in 1904, 12.7 per cent. The death-rate among those treated at home was also lowest in 1915, 5 deaths, 1.1 per cent., while it was greatest in 1904, 104 deaths, 3.5 per cent. The highest per cent. of deaths among those remaining at home occurred in 1911, 9.4 per cent., and the lowest in 1915, 1.1 per cent., with 1906 and 1905 coming very close with 1.2 per cent. and 1.4 per cent. While the death-rate among those treated in the hospital has diminished, the death-rate among those cases remaining at home has decreased even more; and the death-rate for the entire city has fallen during 1915, to the lowest yet on record, 26 deaths, 2.4 per cent.

CHART V.

DISTRIBUTION OF SCARLET FEVER BY
DISTRICTS, 1915.

	Cases.	Cases per ward.
1. Central Philadelphia		
Wards 5, 6, 7, 8, 9, and 10...	27	4.5
2. Frankford.		
Wards 23, 35 and 41.....	21	7
3. North Philadelphia.		
Wards, 11, 12, 13, 14, 15, 16,		
17, 18, 19, 20, 25, 28, 29,		
31, 32, 33, 37, 38, 43, 45,		
and 47.....	439	21
4. West Philadelphia.		
Wards 24, 27, 34, 40, 44 and		
46.....	160	27
5. South Philadelphia.		
Wards 1, 2, 3, 4, 26, 30, 36,		
39 and 48.....	282	31
6. Germantown.		
Wards 21, 22 and 42.....	143	48

SOME PRACTICAL METHODS OF BACTERIOLOGICAL WATER ANALYSIS AND RESULTS OBTAINED THEREWITH.

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Read before the Laboratory Section of the American Public Health Association, Rochester, N. Y.,
September 9, 1915.

The authors in this paper discuss the methods employed and the results obtained in the bacteriological analysis of the water about St. Louis, with the view ultimately establishing definite modes of procedure for such analysis.

THERE are, no doubt, at the present time a large number of water works men at sea as to just what media to use in the bacteriological analysis of water. Some are using dextrose broth, some lactose broth and still others are using lactose peptone bile for the detection of gas formers. Few plants are using the same media and methods for determining the presence or absence of *B. coli*. At some plants counts are obtained on agar, at others on gelatine while at the larger plants counts are obtained on both.

That this condition of affairs is deplorable is beyond dispute, yet we cannot hope to have it altered until the Committee on Standard Methods sets a definite mode of procedure using one certain medium for the detection of gas formers and certain definite media for the determination of the presence of *B. coli*. There must be no choice left the analyst as to the media to be employed or as to the mode of procedure.

It is in answer to the much called for practical data on the subject that

this paper is presented. We wish to give a description of the methods employed and the results obtained in the bacteriological analyses of our local water, not with a view of having judgment passed on its quality but with the idea in mind of giving to all persons interested, the results of the practical application of the methods employed.

We have divided our subject into two parts: Quantitative and Qualitative Analyses.

QUANTITATIVE ANALYSIS.

At the 1905 meeting of the American Public Health Association, the Committee on Standard Methods recommended the use of gelatine as the standard medium for count. In 1911 the change to agar was made and in 1912 the laboratory section passed a resolution advising the use of both gelatine and agar for determining the number of bacteria in water.

Both gelatine and agar media are used in the analyses of our raw and effluent waters. Samples of secondary

importance are plated on agar alone. The media are made in strict accordance with the 1912 Standard Methods. In the plating of samples two plates are always made from each sample on both gelatine and agar. As a rule two dilutions are used unless better results are obtained from one. The agar plates are incubated at 37° C.

for 24 hours; the gelatine at 20 to 21° C. for 48 hours. The average count of the two plates is taken when neither spreader or liquefier has made counting impossible.

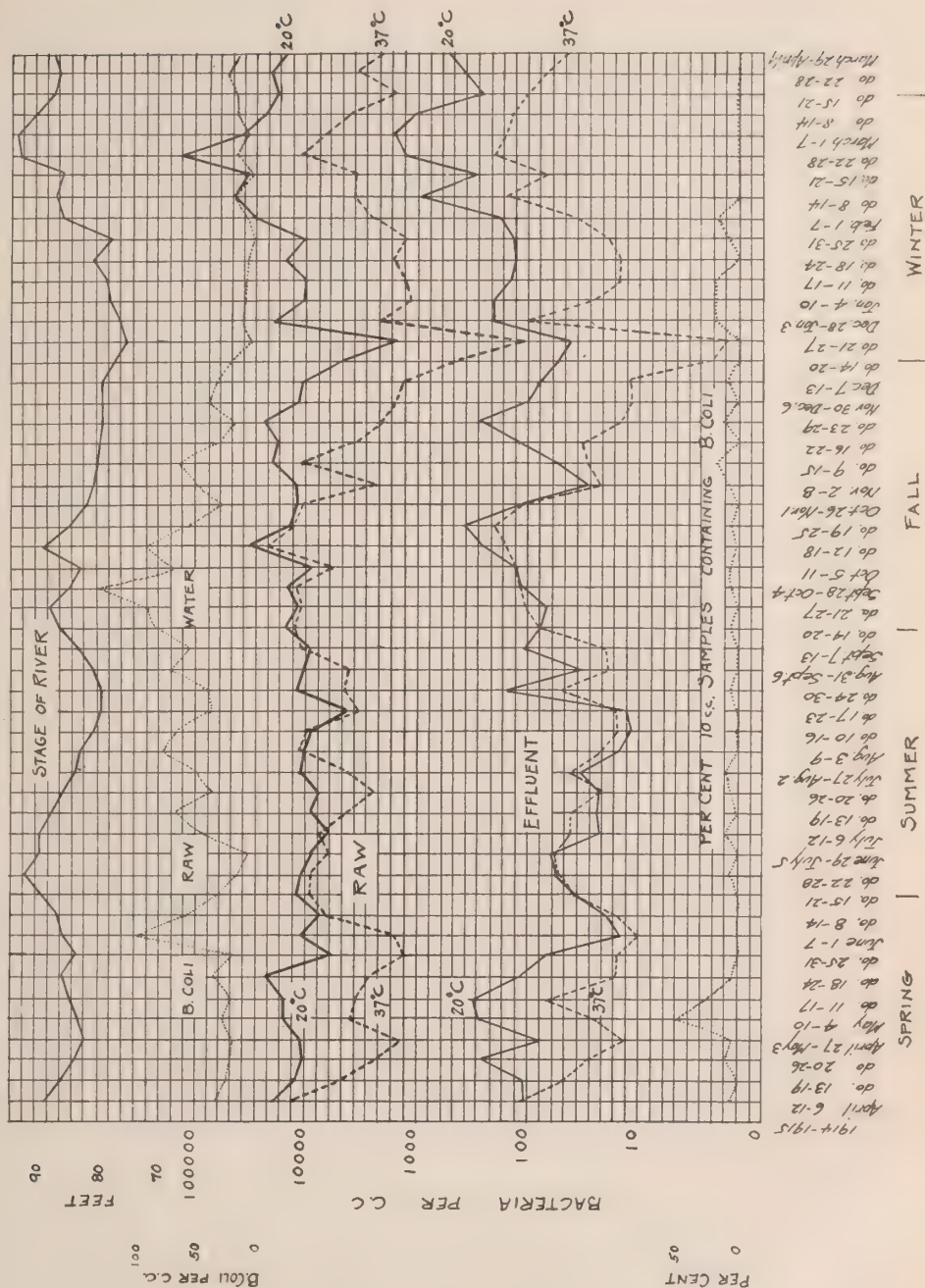
Table 1 gives results of weekly averages for the year beginning April, 1914, and ending March, 1915—our fiscal year.

TABLE 1.
WEEKLY AVERAGES FOR FISCAL YEAR 1914-1915.

1914-1915.	Av. stage of river.	Av. temp. of river water.	River water.					Effluent water.					
			No. of samples.	Count.			No. of B. coli per cc.	No. of samples.	Count.			Per cent. of samples containing B. coli.	
				20°C.	37°C.	Ratio.			20°C.	37°C.	Ratio.	10 cc.	1 cc.
April 6-12.....	88.5	50	11	35,090	20,300	1.7	31	22	132	152	0.9	4.5	0
13-19.....	85.7	53	9	18,290	7,430	2.5	23	22	143	72	2.0	0	0
20-26.....	83.6	59	11	12,380	4,330	2.9	21	22	470	54	8.7	9.0	0
April 27-May 3.....	82.0	64	11	13,530	2,170	6.2	17	21	88	21	4.2	4.8	0
May 4-10.....	83.0	65	11	27,050	6,220	4.4	26	22	490	38	12.9	50.0	18.2
11-17.....	84.2	66	11	27,100	5,850	4.6	21	22	540	85	6.4	22.8	9.0
18-24.....	85.2	67	11	40,800	4,650	8.8	34	20	190	28	6.8	5.0	5.0
25-31.....	83.4	76	8	7,800	1,970	4.0	18	18	86	27	3.2	0	0
June 1-7.....	85.4	78	11	12,090	2,810	4.3	96	22	24	10	2.4	0	0
8-14.....	86.1	81	11	9,000	8,100	1.1	57	22	34	27	1.3	0	0
15-21.....	89.1	78	10	15,390	9,640	1.6	30	20	62	60	1.0	0	0
22-28.....	91.6	81	10	1,560	9,480	1.2	14	20	76	75	1.0	5.0	0
June 29-July 5.....	88.8	77	8	9,440	8,040	1.2	8	15	80	74	1.1	0	0
July 6-12.....	88.8	81	11	8,050	8,900	0.9	45	20	41	65	0.6	10.0	0
13-19.....	87.6	84	11	9,550	6,450	1.5	65	21	43	64	0.7	0	0
20-26.....	85.9	82	10	9,000	4,390	2.1	34	20	41	40	1.0	5.0	0
July 27-Aug. 2.....	83.4	82	11	12,360	6,660	1.9	47	21	56	64	0.9	9.5	4.8
Aug. 3-9.....	81.7	81	9	10,220	13,170	0.8	76	17	26	41	0.6	0	0
10-16.....	80.3	79	11	9,500	9,920	1.0	64	22	18	28	0.6	0	0
17-23.....	79.4	81	11	6,450	5,700	1.1	35	22	20	29	0.7	0	0
24-30.....	79.4	76	11	14,910	6,760	2.2	39	20	255	70	3.6	5.0	0
Aug. 31-Sept. 6.....	80.5	76	11	10,640	6,500	1.6	70	20	55	34	1.6	0	0
Sept. 7-13.....	82.7	73	6	9,580	11,210	0.9	55	17	103	37	2.8	0	0
14-20.....	86.1	71	9	23,440	17,130	1.4	81	22	89	90	1.0	4.5	0
21-27.....	87.4	69	11	15,920	11,730	1.4	87	22	85	106	0.8	0	0
Sept. 28-Oct. 4.....	84.4	68	8	22,500	16,750	1.3	129	19	140	163	0.9	5.3	0
Oct. 5-11.....	82.2	70	11	9,500	7,830	1.2	66	21	197	196	1.0	4.8	0
12-18.....	88.3	60	9	50,220	38,110	1.3	86	17	471	287	1.6	0	0
19-25.....	84.6	62	11	21,050	19,680	1.1	54	21	600	386	1.6	4.8	0
Oct. 26-Nov. 1.....	81.6	55	11	16,140	11,490	1.4	28	21	124	120	1.0	0	0
Nov. 2-8.....	80.4	57	9	17,380	4,240	4.1	48	15	53	40	1.3	6.7	0
9-15.....	80.0	54	11	34,730	10,770	3.2	63	21	74	51	1.5	19.0	0
16-22.....	79.4	42	11	30,910	6,030	5.1	31	22	175	56	3.1	0	0
23-29.....	78.9	41	9	41,560	3,800	10.9	19	17	486	25	19.4	11.8	5.9
Nov. 30-Dec. 6.....	78.9	43	10	13,750	2,900	4.7	38	22	106	17	6.2	0	0
Dec. 7-13.....	78.8	40	9	11,560	2,010	5.8	31	22	91	18	5.1	9.0	0
14-20.....	77.0	33	10	6,930	680	10.2	21	22	76	4	19.0	0	0
21-27.....	74.9	34	6	2,530	130	19.4	4	14	66	3	22.0	0	0
Dec. 28-Jan. 3.....	75.9	34	9	33,140	3,690	9.0	11	17	363	104	3.5	17.7	0
Jan. 4-10.....	77.6	35	11	11,680	1,460	8.0	9	22	382	48	8.0	18.2	0
11-17.....	78.1	36	9	11,060	1,980	5.6	7	22	249	28	8.9	18.2	13.6
18-24.....	80.3	35	11	24,230	2,830	8.6	8	22	205	26	7.9	0	0
25-31.....	77.5	34	11	11,180	1,880	6.0	4	22	209	36	5.8	9.0	0
Feb. 1-7.....	85.3	36	11	49,640	4,390	11.3	7	22	325	62	5.2	18.2	9.0
8-14.....	86.1	37	11	68,410	6,030	11.3	17	22	983	277	3.6	0	0
15-21.....	85.6	39	11	57,450	5,920	9.7	6	22	508	186	2.7	0	0
22-28.....	92.3	40	8	201,630	12,550	16.1	18	18	1,951	358	5.5	0	0
Mar. 1-7.....	93.0	39	10	60,570	8,100	7.5	8	22	2,675	296	9.0	0	0
8-14.....	88.9	39	10	43,450	6,350	6.8	15	20	1,185	239	5.0	0	0
15-21.....	86.6	40	7	32,860	2,690	12.2	16	22	470	108	4.4	0	0
22-28.....	86.1	41	9	37,630	5,720	6.6	23	22	609	86	7.1	0	0
Mar. 29-April 4.....	86.7	43	11	26,950	3,580	7.6	17	22	739	69	10.7	0	0

COMPARISON OF 20°C AND 37°C BACTERIAL COUNTS ON RAW AND EFFLUENT WATERS.

PLATE I



Plates 1 and 2 are plots of the data given in Table 1.

A study of Plate 1 shows, in general, that:

1. With a rise or fall in the river stage there is a corresponding rise or fall in the 20° and 37° C. counts in the raw water, though not always in the same proportion. This change also occurs with the effluent water though not to such a marked degree. In both the raw and effluent waters, the highest count of the year at either 20° or 37° C. occurs at the highest stage, the lowest at the lowest stage.

2. The 20° C. count on the raw and effluent waters is high during the spring and fall and winter whereas it is comparatively low during the summer. The 37° C. count in the raw water is high during the summer and fall and low during the winter and spring while the 37° C. count in the effluent water is high during the fall and winter and low during the spring and summer.

3. With the raw water there is no definite relation of any practical value between the coli count and the 20° or 37° C. count. During the winter and spring when there is considerable fluctuation in both the gelatine and agar counts there is but little fluctuation in the coli count.

During the summer and fall when the variation in count is not so great, there is a marked variation in the coli count.

There is no relation that shows any advantage of one count over the other in representing the sanitary quality of the water. The only relation existing, though of no practical value,

is that the tests for *B. coli* in the raw water are higher during the summer and fall than during winter and spring, thus corresponding to 37° C counts.

The colon content of the effluent water likewise shows no relation between coli and agar or coli and gelatine counts.

A study of Plate 2 shows that:

1. The ratio of the 20° to the 37° C. count is very low in both waters from the latter part of spring to the middle of fall, that is when the temperature of the water is high. On the other hand, the ratio is very high from the middle of fall to the latter part of spring, *i. e.* when the temperature of the water is low.

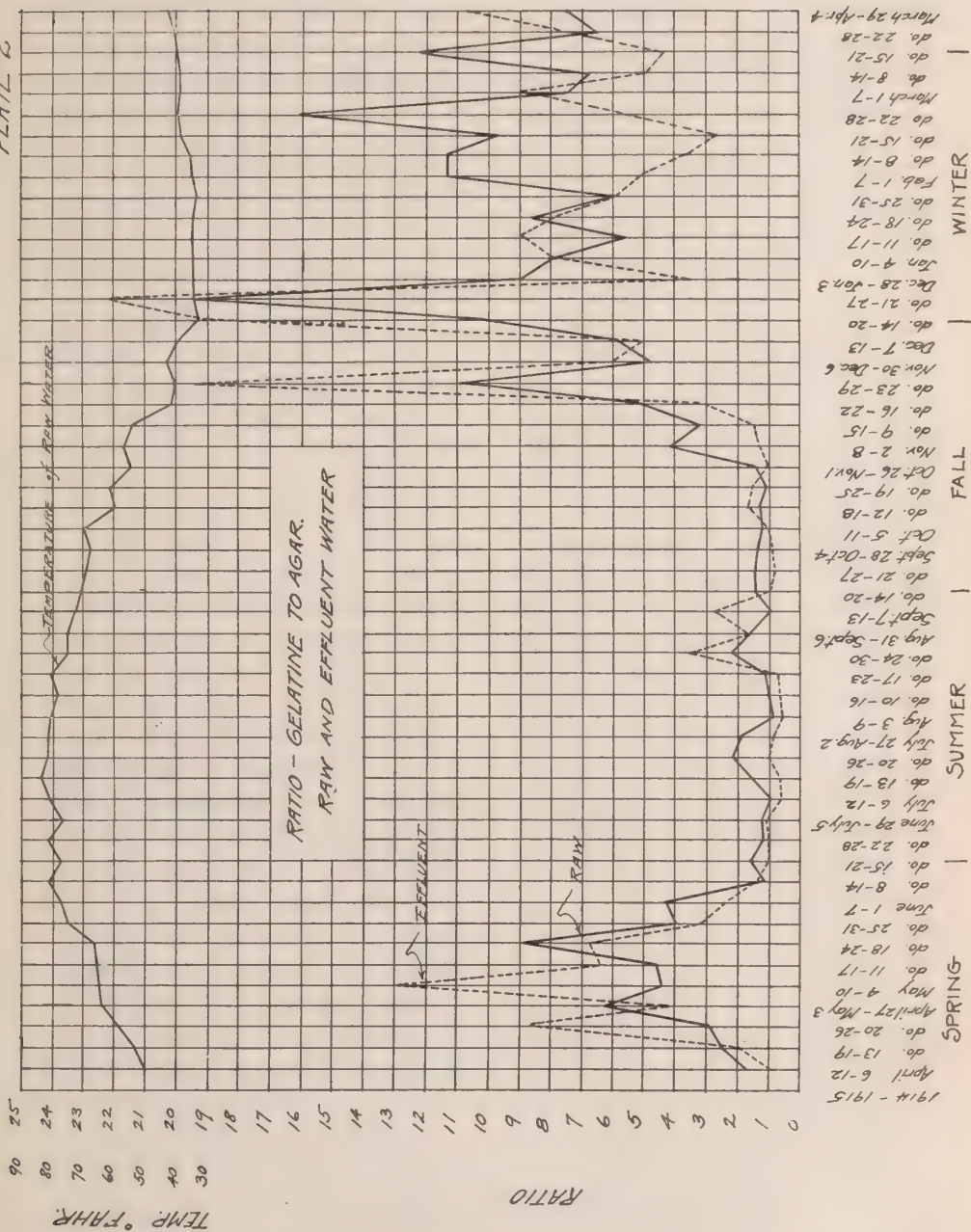
2. During summer and early fall the ratio approaches unity, the 20° C. count frequently being less than the count at 37° C. The lowest ratio occurs during the period of highest temperature.

3. From the middle of fall to late spring the average ratio is unusually high, being highest at the period of lowest temperature.

In the quantitative bacterial examination of any water the total number of bacteria in the sample is the object sought. There is, unfortunately, no method known by which we can obtain a quantitative estimation of all living bacteria.

We have at our disposal the gelatine and agar counts. The usefulness of any method should, among other things, be judged by the value of the results obtained therewith. We would prefer a method which would give us the total count and at the same time serve as an index of the sanitary quality

PLATE 2



of the water. In this respect neither gelatine or agar will answer the purpose.

GELATINE VS. AGAR.

Gelatine is more easily prepared in a shorter time than agar. The character of the fresh beef used in the preparation of both media determines to a great extent the clearness of the product. It has been our experience that with equal care in preparation, gelatine always yields better results. For use in plating gelatine also has some advantages. Agar must be cooled to a temperature slightly above that of its solidifying point. If the medium is too hot some of the bacteria may be killed, if too cold the surface of the plate on setting will have a rugged appearance which will make counting more difficult. As gelatine is slow in setting and has a much lower solidifying point it can be handled with greater ease and with less likelihood of killing the organisms.

Colonies of bacteria, in general, appear more distinct on gelatine than on agar. The gelatine count is more reliable than the agar for the number of plates lost by liquefaction of the gelatine is but a very small percentage of those lost by spreaders on agar.

One of the higher forms of bacteria (*Thiothrix tenuis*) is particularly troublesome in our local water at certain times of the year. Innumerable cases have occurred where a sample plated on agar in one and one-tenth cubic centimeter quantities, has yielded one spreader on the one cubic centimeter plate and no colonies on the one tenth. Frequently both plates have been

spoiled by spreaders. Porous covers are used on all of our agar plates.

It is true that agar will yield a count in 24 hours but since it requires at least 48 hours for the qualitative examination of any sample it does not appear that the 48-hour count for gelatine is a serious objection especially when the sample is being subjected to a thorough examination.

As previously stated neither media is capable of indicating satisfactorily, the sanitary condition of the water. Gelatine gives a higher count than agar, shows a wider range of fluctuation and consequently is a better indicator of any change in the working conditions.

We are of the opinion that it is wise to use a 20° C. and 37° C. count at all water purification plants, for under certain conditions either or both counts may be advantageous.

QUALITATIVE ANALYSIS.

It appears that at the present time there is no universally adopted standard for the qualitative bacteriological analysis of water. The Standard Methods of Water Analysis of the American Public Health Association (1912) recommends the use of lactose peptone bile as the primary medium, whereas, recently, the Commission on Standards for Common Carriers in Interstate Commerce specifies that lactose broth should be used. As to secondary media both recommend either litmus lactose agar or Endo's Medium.

That the methods of the examination of water as supplied to cities and

towns and that supplied to railroad trains should be identical insofar as the primary medium is concerned seems essential. We cannot hope to get comparative results with other workers on the same water if the same primary medium is not used. This has been our experience and has yielded our city no small expense and an unlimited amount of unwarranted harmful advertising.

We have had several years of experience in the use of lactose peptone bile as the primary medium on waters of various degrees of pollution. We wish to present in the following lines our results for the fiscal year 1914-1915.

SOURCE OF SAMPLES.

Up to about May of this year our system of purification has been one of sedimentation and coagulation with disinfection as final treatment. The raw water pumped from the Mississippi River is treated with lime and iron sulphate, flows by gravity through a series of sedimentation basins and thence after treatment with chlorine to distribution reservoirs from which the water is pumped into the mains.

Samples for examination are collected twice each day except Saturday afternoons, Sundays and a few holidays. Bacteriological analyses are made of the raw water, water from settling basins, from the distribution reservoirs and from the city taps.

Confirmatory colon determinations are made on all save river samples, presumptive tests on bile and Endo's medium being sufficient for the raw water.

From April 1914 to April 1915 there were analyzed:

1,462 samples from the settling basins,

1,081 samples from the distribution reservoirs,

1,320 samples from the city taps.

The yearly average count on agar was 183 for the water from the settling basins, 93 for the water from the distribution reservoirs and 86 for the water from the city taps.

METHOD OF EXAMINATION.

Our policy in regard to the method of qualitative examination has been to strictly adhere to the Standard Methods of 1912. All media is made according to the methods specified.

The routine of qualitative analysis is carried out as follows; One ten and two one cubic centimeter quantities from each sample are inoculated into lactose peptone bile. For the ten cubic centimeter quantities straight 9" x 1" test tubes are used, whereas for the one cubic centimeter quantities glass-capped Brown fermentation tubes of about twenty cubic centimeters capacity in the closed arm are used.

These inoculated tubes, after 24 and 48 hours' incubation at 37° C, are examined for gas formation. The gas production in the Brown tube is recorded as the per cent. of the closed arm occupied by the gas. In the straight tubes formation of gas is noted as being a trace (tr.) or plus (+), the former denoting slight fermentation, the latter a vigorous evolution of gas.

If no gas is produced in the bile within 48 hours the result is recorded

as negative. If gas is formed in any tube at the end of the 24- or 48-hour period, a streak is made with a platinum loop previously dipped into the tube showing gas, onto the surface of a solidified plate of Endo's medium. By cutting the solidified Endo's medium on the plate into quadrants, four different transfers can be made on the same plate thereby saving time and media. If the platinum loop is made small enough isolated colonies will always be found at the end of the streak.

The "Endo" plates after inoculation are incubated for 24 hours at 37° C. They are then examined for the presence of colon colonies.

Organisms other than those of the colon group grow very readily in lactose peptone bile as well as on the surface of Endo's medium inoculated therefrom. Furthermore there is an organism (*B. aërogenes capsulatus* of Welch) with which we have very frequently met that will ferment the sugar in lactose peptone bile yet will not grow on the surface or in the depths of an "Endo" plate or of any other medium incubated aëroically. This anaërobic organism will later be referred to.

Realizing that the fishing of a single characteristic colony from any medium and basing the final result on its identification is a practice to be followed with precaution, we proceeded to examine in an experimental way a number of colonies of bacteria of various descriptions that were found on our water supply and that developed on Endo's medium after having been passed through bile.

Assuming that the chance of getting the typhoid organism on the Endo plate was nil it was only necessary to transfer colonies from Endo's medium to lactose broth, for every one will concede that organisms to be members of the colon group must ferment and produce gas in lactose broth. If no gas was formed in 48 hours in the inoculated broth tube, the colony was regarded as not containing members of the colon group. If gas was formed, the broth was examined for gram negative bacilli. If these were found further inoculation into gelatine was made. After four days the gelatine stab was examined for liquefaction.

If the organism picked from the Endo plate fermented lactose with gas formation was a gram negative bacillus and did not liquefy gelatine in four days, that organism was conceded to be a member of the colon group. In almost every case in the preceding experiments when the organism fermented and produced gas in lactose broth, it was gram negative and did not liquefy gelatine in four days.

A total of 301 colonies were examined as described above. It is almost impossible to enumerate in detail minute differences as occur in the appearance of surface colonies, therefore in this work the colonies were divided into three groups, namely red, pink and very light pink. Further differences noted and results obtained will be found in Table 2.

A study of this table suggests that there are three types of colonies that should be sought for in the examination of Endo plates inoculated from

TABLE 2.

APPEARANCE OF VARIOUS COLONIES DEVELOPING ON ENDO'S MEDIUM.

Color of colony.													
Red.								Pink.		Very light pink.			
Deep red. Metallic lustre.				Tiny intensely red capitate colony. Usually tough.		Red or deep pink with red core.		Convex or pulvinate. No red core.		Colonies less than 2 mm. diam.		Capitate colony 2 mm. or more in diam. Usually with gas bubble.	
Flat colony.		Convex or pulvinate colony.											
Number of observations.	Times coli confirmed.	Number of observations.	Times coli confirmed.	Number of observations.	Times coli confirmed.	Number of observations.	Times coli confirmed.	Number of observations.	Times coli confirmed.	Number of observations.	Times coli confirmed.	Number of observations.	Times coli confirmed.
9	0	17	15	27	0	36	28	115	0	90	0	7	6

lactose peptone bile, namely the convex or pulvinate deep red metallic lustrous colonies, the red or deep pink colonies with red core and the very light pink capitate colonies with gas bubble 2 mm. or more in diameter.

Having thus obtained a description of colonies that would generally prove to be of the colon group, we had a basis upon which to judge the type of colony to pick from the Endo plates.

Continuing the description of our routine method of analysis—the colonies developing on the Endo plates having the appearance of the above types were gram stained, inoculated into lactose broth and into gelatine as stab.

Thus we regard as confirmatory tests for *B. coli*: the fermentation with gas production of lactose peptone bile inoculated from the sample to be tested, the growth of typical colonies on the

surface of Endo's medium inoculated as smear from bile, the fact that the typical colonies are gram negative bacilli and that they will not liquefy gelatine in four days and will produce gas in lactose broth in two days.

RESULTS.

The striking feature of the results of the bile tests on our water is the enormous number of cases in which tubes showing gas yielded negative colon tests. (See Table 3.) Very frequently no growth whatever developed on the Endo plates inoculated as a smear from bile tubes showing gas. Unfortunately this feature was not noted until its occurrence assumed such proportion as to be annoying. It was then that a further study revealed that the organism *B. aërogenes capsulatus* of Welch was causing the trouble. It was found that this organism could be

TABLE 3.

SHOWING THE RELATION BETWEEN GAS FORMATION IN LACTOSE PEPTONE BILE AND THE PRESENCE OF *B. COLI* IN WATERS OF DIFFERENT DEGREES OF POLLUTION.

Source of samples.	Ten cc. tests.								One cc. test.																Total No. of samples gasing in lact. pept. bile.	Per cent. B. coli.	Total from all sources gasing in lact. pept. bile.	Per cent. B. coli.
	Degree of gas formation.								Amount of gas formation—per cent. of closed arm.																			
	24 hour transfer.				48 hour transfer.				24 hour transfer.								48 hour transfer.											
	Trace		Plus		Trace		Plus		Tr.-25		26-50		51-75		76-100		Tr.-25		26-50		51-75		76-100					
	No. of observations	% B. coli	No. of observations	% B. coli	No. of observations	% B. coli	No. of observations	% B. coli	No. of observations	% B. coli	No. of observations	% B. coli	No. of observations	% B. coli	No. of observations	% B. coli	No. of observations	% B. coli	No. of observations	% B. coli	No. of observations	% B. coli	No. of observations	% B. coli				
Settling basins	48	35	290	61	19	21	96	26	188	31	65	54	46	39	56	27	94	13	28	57	25	48	11	55	966	41		
Distribution reservoirs...	119	7	281	18	79	4	138	12	98	5	26	15	17	29	17	0	40	3	13	15	8	13	8	25	844	12	2873	19
Consumer's tap	183	4	242	8	139	4	206	5	109	6	29	7	25	0	27	0	83	0	12	0	4	0	4	0	163	5		

obtained in pure culture from bile by successive daily transfers to sterile bile. The organism was frequently lost at first, because only a loop of the inoculated bile was used in making the transfer. Later 1 cubic centimeter quantities were transferred and always carried the culture along. Failure to transfer for three or four days resulted in the loss of the culture. Gas was also produced in lactose and saccharose broths when 1 cubic centimeter quantities were transferred to them. But slight gas formation was obtained in mannite and dulcitate broths.

Litmus milk inoculated with the organism in pure or mixed culture, heated at 80° C. for ten minutes and incubated anaërobically for 48 hours at 37° C. showed stormy fermentation with the discharge of color, coagulation and the peptonization of the curd.

A freshly boiled tube of nutrient agar inoculated while hot with a loop full of the bile culture and incubated for 24 hours at 37° C. showed violent gas formation in the depth with a breaking up of the medium.

From a study of Table 3, we note that of 2,873 cases of gas production in lactose peptone bile only 542 or about 19 per cent. yielded confirmatory *B. coli*. This clearly shows that gas production in lactose peptone bile does not necessarily indicate the presence of a member of the colon group.

Judging pollution by the number of 37° C. bacteria growing on agar in 24 hours, we find that in the case of the settling basins (unchlorinated water, with an average count of 183 per cc.) there were 966 cases of gas formation in bile with 395 cases or about 41 per cent. yielding positive

tests for *B. coli*. In the distribution reservoirs (after chlorination, count 93 per cc.) there were 844 cases of gas formation with 97 cases or about 12 per cent. confirmatory *B. coli*, while in the water from the taps (average count 86 per cc.) there were 1,063 cases of fermentation in bile with only 50 cases or about 5 per cent. positive tests for *B. coli*.

From these figures it would seem natural to conclude that the bile test is a better index of the presence of *B. coli* the more polluted the water. In other words gas production in bile is less indicative of pollution, the purer the water tested.

With the 10 cc. quantities of water it would seem that a vigorous production of gas in 24 hours yielded positive tests for *B. coli* in a greater per cent. of cases from all sources than in the cases in which gas was not noted previous to the 48-hour period. Likewise with the 1 cc. quantities, we note, in general, that when the gas production was from 25 to 75 per cent. of the closed

arm within 24 hours, a greater per cent. of positive tests were obtained than under any other condition.

A review of the available literature on the subject at hand shows varying results by different workers using lactose broth on the same class of water.

In the examination of about 1,000 samples of drinking water from railroad trains, R. H. Creel* obtained 454 samples in which 15 cc. produced gas in lactose broth. Of these, only 96 samples or about 21 per cent. proved to be *B. coli*.

On the other hand Edward Bartow† in the examination of drinking water on railway trains using the method adopted by the Treasury Department for drinking water on trains, obtained from 67 samples of water, 109 positive tests for gas formation in lactose broth. Of these, 91 tests or about 83 per cent. were shown to be *B. coli*.

* Hygienic Laboratory Bulletin No. 100, pp. 43-57.

† *Journal of the American Water Works Association*, Volume 2, No. 1.



REPORT OF THE COMMITTEE ON COLD STORAGE.

Presented to the American Public Health Association, Rochester, N. Y., September 7, 1915.

THE European conflict has added many burdens and responsibilities to the neutral nations on this side of the Atlantic. The whole complexion of business has already been materially changed. What opportunities and responsibilities may be ours as the war progresses or at its close, are difficult to predict, but it seems certain that they will be numerous and of a serious character. To a very large extent the belligerents are now looking to us for food and as the fighting continues we must more and more supply the materials for sustain-

ing life. When peace is concluded and the freedom of entry into all ports for all products is again possible, it would appear probable that the demands upon us for foodstuffs would be for a time even greater than while the present conditions prevail. All of these more or less trite but obvious statements lead us to the point that there must be a greater conservation of our food resources. These resources will be severely taxed, and in order that we may satisfactorily discharge the obligations thus thrust upon us there must be a cutting out of all unnecessary

waste. This means that there must be a better handling and storing of the perishable food. To a very large extent the prompt and proper use of cold storage must play the important part in such a conservation movement.

For this and other reasons your committee has been impressed with the importance of encouraging, or promulgating if possible, propaganda for more and better storage facilities, and for greater use of the facilities now at hand.

During the year since the committee's third report was read to this Association at Jacksonville, eight or more states have introduced the so-called Uniform Cold Storage bill in their legislatures, and in a majority of these states it was passed and has become law. Notably in Pennsylvania it was defeated. In Congress the MacKellar bill never progressed beyond the committee hearing stage. This bill, in the judgment of your committee, laid entirely too much emphasis on the length of time which various food products may remain in cold storage and was not intended to encourage a more liberal use of cold storage to the end that a greater conservation of foodstuffs might be secured.

Such scientific investigations as have been made during the year have only tended to confirm the stand taken in your committee's second report (1913) in which it said:

"The committee believes that in all this (cold storage) legislation too much attention is being paid to the question of the length of time which various food products may remain in cold storage. The important point from a public health standpoint, as well as an economic one, is,—are the foods wholesome when placed in cold storage and are they in like condition when removed. Such scientific investigation as has thus far been made is not sufficient to say that any given food will remain good in cold storage for a given number of months and beyond that will be unfit for food. Nor do these investigations support such time limitation legislation. The two important points which this committee would urge with all emphasis are: First: that foodstuffs be in proper condition when placed in cold storage; and second, that foodstuffs not intended for immediate consumption be placed in cold storage at the earliest possible moment."

Since the above was written Dr. Pennington of the United States Department of Agriculture

has demonstrated the importance of these two points in the story of "The egg and poultry demonstration car work in reducing our \$50,000,000 waste in eggs." In this connection Dr. Pennington says: "The chilling of eggs is almost the beginning and end of keeping New York and other great cities supplied. Heat is the great enemy, for once a good egg has stood for any time at a temperature of over 68° F. it begins to incubate, if it is a fertile egg, or to spoil, if it is an infertile egg." Dr. Pennington estimates the value of the eggs of commerce to be \$750,000,000 annually. The spoilage is therefore approximately 7 per cent. No reliable figures are known by your committee on the yearly loss from improper handling of other perishable food products. The total must be enormous. Can nothing be done to stop this loss of valuable food? Your committee has been giving this question serious consideration and now believes the time is ripe to undertake some educational work that will have for its object the breaking down of unwarranted prejudice against cold stored foods; the economic importance of the use of cold storage in the conservation of the food resources; and the importance from a public health standpoint of a sufficient wholesome supply of foods. The committee is without funds to carry on any work and it realizes that the Association is in no position to finance an educational campaign. The committee therefore proposes to inaugurate, with the consent and approval of the Association, a campaign financed by contributions from the outside. The rough outline of this campaign is here described.

First, it is proposed to interest one or more of the popular magazines to accept and publish one or more articles written in popular style which shall describe cold storage, its importance in the conservation of food, its control, and its indispensability in the modern scheme of food distribution. These articles would have the effect, it is hoped, of breaking down some of the unwarranted prejudice which the housewife and the average consumer now hold toward cold storage foods.

Second, it is proposed to publish in the farm, small town, and other periodicals circulating in rural communities, articles giving such information as is available about the loss in the food supply due to improper handling, particularly to

carelessness or indifference to the necessity of prompt cooling of perishable foods not intended for immediate consumption. This series will be intended to instruct the farmer that primarily from a public health standpoint, and secondarily from an economical standpoint, foods should be kept wholesome by the prompt use of cold storage, and where that is not readily available of providing it or some means of chilling or pre-cooling.

Thirdly, it is proposed to have prepared a number of moving picture films which will tell in some interesting and popular way the story of cold storage and its benefits to the public. This will be illustrated by telling the story with pictures of some particular food industries which are dependent on cold storage for their very being, such, for instance, as the egg industry, the fish industry and the fruit industry.

Some progress has been made toward the working out of the details essential to this campaign. Through the suggestion and aid of Dr. Pennington much valuable material has become available for the articles both for the popular and agricultural periodicals. Also through the assistance of Dr. Pennington and the chairman of the Publicity Committee of this Association, Mr. Waldo, steps have already been taken to interest certain periodicals to print such articles as may be presented. For this branch of our program it does not seem likely any funds will be necessary.

The making of a moving picture film is a more ambitious project and one that cannot be undertaken without considerable expense. The preparation of a film to illustrate the egg industry has first been taken up because it is firstly one of the largest of the food industries; secondly, because it is one of the few about which we have a fairly accurate information, as to the extent of the annual loss; thirdly, because eggs are used in practically every household, and fourthly, be-

cause it is believed possible in illustrating it that an interesting film can be developed.

Fearing that we might be looking at this with prejudiced eyes, your committee has approached men in the egg industry, explained to them its program, and asked them frankly to tell it if in their opinion what it is planning is worth while; also whether they thought their industry could be worked up into an interesting film; and lastly if they would be willing to contribute toward the expenses. So far as your committee has gone it has met with an affirmative to all its queries from all those approached. It has been invited by the Committee on Publicity to present its plans to their coming convention of the National poultry, Butter and Eggs Association. Your committee awaits the approval of this convention to its plans before it accepts the invitation. It has also in similar manner presented its plans to an officer of the Warehousemen's Association, and has also answered its queries affirmatively.

Your committee therefore believes it can best serve the cause of public health by seeking to bring about a more general use of cold storage, particularly the prompt cooling of perishable foods at the point of production; that this can best be accomplished by the educational program outlined herein; that being without funds it would not be improper to accept contributions from those interested in the industries affected; and that the effects of such a campaign would be to conserve a greater proportion of the food produced and with a tendency to increase the supplies of the higher qualities.

Your committee would therefore request that the Association give its formal approval to its proposed campaign.

Respectfully submitted,

PROF. W. T. SEDGWICK,

DR. H. E. BARNARD,

DR. PETER H. BRYCE,

F. D. BELL, *Chairman.*

Book Review.

Diseases of Occupation and Vocational Hygiene. Edited by Dr. George M. Kober and Dr. William C. Hanson. Twenty-nine contributors. Pp. 918+ xxi. P. Blakiston's Son & Company, Philadelphia, 1916. \$8.00 net.

To those who have been attempting to teach industrial hygiene during the last few years, the need for satisfactory, up-to-date reference books on the subject has been only too obvious. A book which went far to meet requirements from this point of view was "The Modern Factory," by Dr. George M. Price. Especially suggestive was this volume in its discussion of the usually neglected problems of machine guarding, fire prevention, welfare work, etc.

Now, however, the ever increasing number of physicians and sanitarians interested in industrial problems are fortunate in having placed at their disposal an extremely comprehensive compilation, including contributions from a host of authoritative editors selected from a wide range of activities and interests. Among those contributing to this volume, edited by Doctor Kober and Doctor Hanson, are Dr. John B. Andrews, New York City; Dr. Alice Hamilton, Chicago; Dr. E. R. Hayhurst, Columbus; Dr. Frederick L. Hoffman, Newark; Dr. Frederick S. Lee, New York City; Dr. Owen R. Lovejoy, New York City; Sir Thomas Oliver, England; Dr. John W. Trask, Washington, D. C.; Prof. George C. Whipple, Cambridge, Mass., etc. These names illustrate the scope of interest on the part of the contributors, including as they do, the practising physician, the legislator, the statistician, the physiologist, the sanitarian, and the sociologist.

In a foreword, the editors state that their aim "has been the presentation of the basic data concerning the diseases of occupation in such a way as to render them available not only to physicians, but also to employers, employees, efficiency experts, public health officials and legislators." To meet this objective, the book is divided into three parts.

Part One deals with specific and systemic diseases of occupation, and was devised particularly to furnish scientific information on the pathology, symptoms and treatment, for those interested in personal and medical phases of the problem.

Part Two approaches the problem from the occupational side, dealing with cause and prevention, and is of special interest to employers, employees, social workers, legislators, etc.

Part Three, and here the classification is perhaps not entirely clear or obvious, is intended to be of service to those who may be called upon to investigate the relation of the shop, the dispensary or the hospital to diseases of occupation. Much space is here devoted to statistical and legislative problems.

As is to be expected, the volume is especially complete in its discussion of trade poisons, considering them first from the point of view of the toxæmia itself and then making an extremely useful and somewhat comparative approach from the point of view of the occupation and the process. The special poisons are discussed by experts whose experience has furnished them with intensive knowledge of their particular field, whether it be carbon bisulphide poisoning, lead poisoning, the relation of dust to pulmonary disease, fatigue and industrial disease, etc.

In a volume as complete in many respects as is this book, some readers might perhaps like to see more attention given to the specific methods of accident prevention in industry. The volume contains many helpful illustrations, but could, perhaps, have been supplemented to advantage in this regard.

In addition, while the extremely important subject of personal hygiene is by no means neglected, one might wish for a more clean-cut and more prominently featured discussion of this subject. It is all there, but somewhat buried, and has to be searched for.

On the whole, however, the book should prove extremely useful to all interested in the subject, as the physician, the teacher, the sanitarian, the factory owner, or legislator. The point of view as regards certain controversial subjects, such as control of infectious disease, ventilation, etc., seems to be modern. The social aspect of industrial problems is not entirely neglected, for many of the contributors bring special experience from the social and economic fields. It might be mentioned, incidentally, that a brief yet interesting historical review of hygienic work in industry, will be found in the prefatory note.

D. B. Armstrong, M. D.

Health Department Reports and Notes.

REPORTS.

Cincinnati, Ohio.

The American Public Health Association this month is to meet in a city whose health record, as reported in the 1915 annual report of the Board of Health, is one of exceptional merit. The city of Cincinnati "through the cumulative effect of five years of intensive work" announces the breaking of all previous records along several lines, and the adoption of certain methods of procedure in complete accordance with modern theory and practice of public health.

The general death-rate has been reduced to 15.63 per 1,000 population, the lowest in the city's history; the tuberculosis death-rate reached the lowest point in many years, being 2.20 per 1,000 population; the infant mortality rate fell to 78; the deaths due to gastro-intestinal diseases in children under two fell to 175, which is only 46 per cent. of the deaths from this cause in 1910.

Upon examining these several excellent results, it is found in the case of the tuberculosis death-rate reduction, that the decrease is real and is not due, as is often the case, to possible errors in filling out death certificates. For instance, the tuberculosis death-rate diminished steadily from 2.81 in 1910 to 2.20 in 1915; furthermore, the reduction in "combined death-rate due to all respiratory diseases and tuberculosis" also decreased from 5.19 in 1910 to 3.99 in 1915. Thus the Board of Health, since assuming control of this department, can demonstrate a reduction of over 21 per cent. in the city's tuberculosis death-rate, and over 23 per cent. in its combined death-rate due to all respiratory diseases.

The reduction in infant mortality from all causes and from diarrhea and enteritis in children under two is attributed directly to the food inspection, particularly to efficient milk inspection. This is effectively shown by the two five year periods since 1906. The first period, in which there was no milk inspection, showed a varied infant mortality rate from 151 to 124; the second period, 1911 to 1915 (milk inspection was begun in 1911) varied from 103 to 78.

This substitution of a pure for an impure milk supply is considered also as a potent factor in the decrease of the general death-rate, even more so than was accomplished by water purification. Thus the average yearly decline following water filtration (three year period) was 2.03. The average yearly decline following efficient milk control was 1.15 lower than had been accomplished by water purification. As a consequence of this phenomenon, comparable with the Mills-Reineke phenomenon, Doctor Landis, chief health officer, has predicated the following hypothesis: "The reduction in the general death-rate of a municipality brought about by the purification of its milk supply, is practically the same as that caused by its change from a polluted to a pure water supply."

With the exception of an outbreak of measles, Cincinnati suffered from no epidemics, and the control of communicable diseases, under the able supervision of the chief medical inspector, Dr. Wm. H. Peters, seems most efficient. It is interesting to note the new quarantine procedure adopted by this city last December. As a consequence, the quarantine period and restrictions of those suffering from diphtheria, measles, whooping-cough, and mumps, or those in contact with them, has been lightened. In this way the unnecessary loss of time from school for the children has been abolished.

From the report of the medical relief of the poor, it is obvious that Cincinnati has maintained vigorous activity in this field. The work of the district physicians, the anti-tuberculosis league, and the infant welfare department deserve the sincere appreciation of the city. It is well to note that the health department is working in complete harmony with the charitable organizations. Such coöperation tends to minimize the abuse of charity.

Much attention has been paid to school hygiene, and the results from the sanitary inspection of school buildings and conditions of study, medical and dental inspection and treatment of school children, attention to children of

the pre-school age, and the education and instruction of children in personal hygiene are highly satisfactory.

Among the recommendations for the coming year, Doctor Landis advocates an extensive increase in his staff, a well deserved increase in salaries, the substitution of terminal disinfection with gaseous germicides by mechanical cleansing

with liquid germicides, and the appropriation of the full budget requested. We hope that the people of this city will realize the full importance of this work being done and show their appreciation of the ability and unceasing energy of their health department, which has made this excellent report possible, by acceding to its recommendations.

NOTES.

Scoring the Sanitary Condition of Farms.

—The Division of Sanitary Engineering of the West Virginia State Department of Health under the direction of the Chief Engineer, Mr. Mayo Tolman, is working on a score card for rating the sanitary conditions of farms. Perfect sanitation is represented by 100 points which are divided among all factors that tend to sanitary perfection as the water supply, disposal of wastes, etc. These points are subdivided among such factors as location of the well, its construction, the location of the privy, its type and construction, disposal of sink wastes, disposal of garbage, presence of screens on the house, handling of manure at the barn and so on. In order to create an interest in better farm sanitation, prizes are to be given each year at the "County Fairs" to the two farms in each county that show the greatest improvement in sanitation. One prize will be awarded to the farm for the highest total score, and the other to the one that shows the greatest gain in points during the year.

Those farmers who wish to enter the contest are required to hand in their names to the Health Department by October 1st, when the farm will be visited and rated by a representative of the Division of Sanitary Engineering. A second visit will be made to each farm the following June, and a new rating given. A comparison of the two scores thus obtained will determine the winners of the prizes.



The Prevention and Relief of Heart Disease.—In New York City, at the present time, over 10,000 deaths are reported annually as due to organic heart diseases, and in 1912, over 86,000 deaths from chronic heart disease occurred in the United States Registration Area. The apparent indifference of health departments in the administrative control of this

problem has been no doubt due to the fact that the deaths reported are in the higher age groups. The New York City Health Department believes, however, that this age grouping is misleading, "for it gives no true picture of the age distribution of heart disease in the community," and that a much better picture can be gained by noting the age incidence of cases of heart disease observed in hospitals. Such a study shows a very large proportion of cases in all the age groups, commencing with as early as 10 years of age. The following table is cited, the 1,300 cases being taken from the report of a hospital in Glasgow:

ORGANIC HEART DISEASE HOSPITAL CASES ARRANGED BY AGE.

Under 10	20 cases
10-20	221 "
20-30	264 "
30-40	274 "
40-50	257 "
50-60	186 "
Over 60	124 "
Total	1,346 "

To quote the *Bulletin* in regard to the control of this problem, and to the formation of an organization with the relief and control of this problem as its object:

"The physical examinations conducted by the Bureau of Child Hygiene indicate that approximately 15,000 of the 800,000 public school children suffer from organic diseases of the heart. It is clear, therefore, that the enormous prevalence of heart diseases in the community constitutes a public health problem of the first magnitude. Recognition of these facts has lead to the organization in this city of an Association for the Prevention and Relief of Heart

Disease. In a report just made by the Association, the opinion is expressed that the prevention of heart disease depends largely upon a study of the causes of the condition. These causes may be grouped under the headings infectious diseases, intoxication and improper methods of living. Of these, the infectious diseases seem to offer the most immediate point of attack; and of the group of infectious diseases those resulting from the so-called rheumatic group seem to be the most vulnerable.

"The program of the Association for the Prevention and Relief of Heart Disease embraces the following:

"1. To gather pertinent data from many sources, and to arrange it for general use and practical application to the purposes set forth.

"2. The office of the Association to serve as a central cardiac information bureau.

"3. To help in coördinating the various efforts in this field—as made by Health Department, school examiners, cardiac classes, dispensaries, special investigators, Trade School for Cardiacs, etc.

"4. To organize facilities for cardiac convalescence, to provide larger opportunities in existing institutions, through assurance of better selections of patients, better treatment, etc. (Especially for youth.)

"5. To help to establish more cardiac classes in clinics in appropriate districts, and to extend and correlate their efforts.

"6. To study and develop occupations for cardiacs, in standard trades and situations, as well as in special lines as already begun. To take constructive interest in workman's compensation and like problems affecting cardiacs.

"7. To work constantly for the prevention of heart disease, through the power of accumulated information effectively presented, and the increasing application of recognized means (such as adequate facilities for throat and dental treatment, particularly for children).

"8. To encourage the setting up of branch (or like) associations elsewhere.

"Eight special cardiac classes having a uniform working plan for the division and classification of cases have already been established. Seven of these are in Manhattan and one in Brooklyn.

"This program gives promise of effective work in reducing the incidence of heart disease

and so preventing much future preventable suffering and disability.

"The Department of Health welcomes the new Association and the aid which it will, undoubtedly, furnish in this important domain of preventive medicine."



A Vaseline "Squirt Gun" Marker.—We are indebted to Mr. F. A. Mantel, Chemist and Bacteriologist of the Memphis Department of Health, for the following brief communication:

"In the course of the routine of Widal and Malarial examinations in this laboratory which entail of course the 'ringing' of many hollow ground slides, I devised the following 'squirt gun' which I find is a great time saver and makes a very neat ring.

"Besides ringing for 'Widals' or other hanging drop preparations, I find the device of much service in the staining of blood smears: Outline the good portion of smear to be examined with the fine line of vaseline from the squirt gun and drop the stain in the plot, thus marked out. The stain of course cannot run off the slide or from the smear or preparation to be stained.

"The 'gun' is made by fitting a glass rod in a short piece of glass tubing of any size bore which is drawn to a very fine point, to any desired size opening. By causing suction at the drawn out end, fill the tubing with vaseline or the like. Insert plunger and thus have an ever ready 'squirt gun'."



Tuberculosis in California Indians.—Nearly 30 per cent. of all deaths of Indians in California are due to tuberculosis. Trachoma and tuberculosis are more prevalent among the people of this race than any other of the communicable diseases. North Fork, Madera County, is the center of population for hundreds of these people, and the Bureau of Tuberculosis of the California State Board of Health has urged the Department of the Interior to establish a sanatorium for the Indians of this district. The government has land near the school and a mission already established there, and pupils and teachers are most desirous that a dispensary and hospital be established.

Tuberculosis has wrought great havoc among these people. In fact, so great has been the prevalence of the disease among them that, con-

trary to general belief, they are quite willing to enter a hospital, when ill. They are said to be model patients, willing to follow instructions and to obey orders. They want to die near home, however, just as any of us do. Consequently, many an Indian has been transported from the county hospital, over many miles of rough mountain roads, to reach home before death might come. Many times they have died before arriving at their homes. The establishment of a government sanatorium and dispensary would provide a place near at home for treatment and care.—*Monthly Bulletin of the California State Department of Health.*



The Family Physician and Typhoid Fever.

—As a new routine procedure in typhoid fever, the following letter to physicians is now sent to physicians who report cases of that disease to the New York City Department of Health. A sufficient supply of vaccine for initial doses is also sent, to avoid delay in immunizing exposed persons

The letter also deals with the conditions under which removal of typhoid fever patients to hospitals may be necessary.

More care, it is felt, is needed in the termination of cases of typhoid fever. The patient should be informed as to the likelihood of his being at least a temporary carrier of infection, and instructed accordingly.

"Acknowledgment of your report of a case of typhoid fever at ——— has been made in the usual way. Laboratory confirmation of the diagnosis is very desirable. If a Widal test has not been made, please send a blood specimen for such test. If it has been made, please notify the Department of the result. In obscure cases, a fecal examination is often conclusive. The Department will make such examinations at your request.

"Immunization should be offered to and urged upon all members of the household who have not had the disease, if they are in any way exposed to contact with the patient. That there may be no delay, we are sending you a supply of anti-typhoid vaccine by mail. You may have an additional supply free by mail or at any Borough Office, or a Department physician will administer it for you at your request. Arrangements can be made with the Branch Office at ———, tele-

phone ———, or the Central Office, telephone Franklin 6280.

"Save under very exceptional circumstances, home treatment of typhoid fever is distinctly hazardous. Enclosed is a typhoid circular. These 'Rules' are designedly expressed in as simple language as possible, but further exposition by the physician is none the less necessary. If no trained nurse is in charge of the case, a Department of Health nurse will be sent to note whether or not proper precautions are being observed, and give necessary instructions as to details.

"Unless the following conditions exist, it may be necessary for this Department to remove cases of typhoid fever, especially in crowded tenements, to a hospital:

1. The patient must be actually isolated, visitors excluded, stools and urine adequately disinfected, and all susceptibles immunized against the disease.
2. The attendant on the patient must have nothing to do with the family cooking, care of children, etc. (Statements on this point which are manifestly untrue must not be accepted.)
3. There must be a watercloset or privy for the exclusive use of the patient's family.
4. The family must be sufficiently intelligent and willing to carry out the rules of the Department of Health for the home care of typhoid fever.

"The recent ruling of the Board of Health regarding termination of typhoid fever cases by bacteriological examination of feces and urine is now in force. These specimens are not to be collected before the tenth day after the temperature becomes finally normal. A typhoid fever convalescent may not return to work except with the approval of the Department of Health, based on the result of laboratory examination. The specimens may be collected in the Diazo outfits furnished at culture stations. They must be fresh, and delivered at the laboratory within a very few hours after voiding. To insure this, until further notice, they will be called for, arrangements being made by the Department nurse. The patient should remain isolated until the result of the examination of the feces is known. Not a few typhoid convalescents are temporary carriers, and the number of recog-

nized chronic carriers is rapidly increasing. In examination of stools, little reliance is to be placed on a single negative result, the Widal at this time being regularly positive. Hence all precautions must be observed.

"Finally, the source of your patient's infection is of especial interest. If you have arrived at any conclusion on this point, or if you discover any facts bearing upon this aspect of the case, please notify us. When our own investigation is completed, we shall be very glad to compare notes with you."

✱

School for Public Health Nurses.—The *Board of Health Bulletin* of the State of Wisconsin announces the establishment of a training school for public health nurses. This school has been organized by the Wisconsin Anti-Tuberculosis Association in coöperation with the Milwaukee Visiting Nurses Organization and the Milwaukee City Health Department, and according to this bulletin, it is the first training school for the education of nurses along this particular line of work organized in the country. Up to this time throughout this state it has been difficult to obtain the services of a sufficient number of especially trained and competent nurses for this work, particularly on account of the unusual demand for both rural and urban public health nurses. The public health nurse is the most valuable a health officer can have, and it is to be hoped that this new movement will meet with every success.

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A Sick City.—The Division of Health of the City of Toledo, Ohio, was asked to comment in the *Toledo Weekly City Journal* on the health situation of that city. The following rather startling indictment and prophecy was the result:

"It is true that there is scarcely an activity of our city government that does not have more or less influence upon the health of the people. So long as the city is inadequately financed and there is provided insufficient funds for the various departments to do their work thoroughly, just so long will the death-rate be high in Toledo.

"The tremendous price that we are paying in health and life for economy is indicated in the following table, which is a comparative statement of sickness and death from certain of the

better known reportable diseases during the first eight months of 1915 and 1916 each:

	Cases.		Deaths.	
	1915	1916	1915	1916
Typhoid fever.....	191	145	26	26
Diphtheria.....	145	211	18	25
Measles.....	527	4984	4	68
Scarlet fever.....	135	427	4	5
Whooping-cough.....	546	486	20	11
Smallpox.....	61	209	0	1
Poliomyelitis.....	1	84	1	17
Tuberculosis, all forms...			245	283
Diarrhea, under 2 years of age.....			63	126
Lobar pneumonia.....			85	139

"We prophesy that this parsimony in the maintenance of the necessary functions of civic government and the lowered resistance of our people because of the undue prevalence of disease thus far this year will result during the coming winter, in the highest death-rate that Toledo has ever had.

"This calamity may be partly avoided by an immediate rehabilitation of all departments. Even so the damage is done and is just now reaching its climax. We will require years to overcome it with the best facilities that can be provided. Toledo is assuredly a sick city."

✱

The Low Cost of Health.—We hear much of the high cost of living, but we overlook the fact that many of the best things of life can be had for nothing.

It costs nothing to stand up and walk and breathe properly.

Fresh air in the home is free.

No expense to taking a few simple exercises every morning.

It costs nothing to chew the food thoroughly.

It costs nothing to select the food best suited to the body.

It costs nothing to clean the teeth twice a day.

It costs no more to stop using patent medicines.

It costs no more to read good books than trashy literature.

It costs nothing to have a cheerful, happy disposition, and stop having grouches.

These things cost nothing, yet they will bring content and reduce the doctor bill to nothing a year.—*For You*, Ford Motor Co.

Public Health Notes.

Anopheles Infectivity Experiments.—The *United States Public Health Report* for September 1, 1916, contains an interesting account of the extensive experimental work carried on to determine the number of persons one mosquito can infect with malaria:

"The work here described was conducted in the course of malarial investigations under the charge of Surgeon R. H. von Ezdorf, United States Public Health Service, and the findings and the care of the cases had his supervision and confirmation.

"In an effort to ascertain the infectibility of *Anopheles punctipennis*, several volunteers were bitten successively by a series of three mosquitoes, which had been applied ten days or more previously to an uncomplicated case of benign tertian malaria.

"If it can be established that a malarial mosquito once infected remains so, it would appear an added contribution to our knowledge to at least approximate the extent of this infectivity. Is every bite an infective one, and how many persons in a community can be infected by the same mosquito? A partial solution of these problems is attempted in this series of experiments. Here fourteen cases of malarial fever resulted from the bites of infected mosquitoes. In eleven of these successful transmission resulted from mosquito biting which was purposely interrupted in order to induce the insects to bite as many persons as was practicable. Applying the mosquitoes so that one person after another was bitten in rapid succession (or at short intervals), it was indicated that in nine of these experiments successful conveyance of malaria resulted.

"The factors governing the power to convey infection are regarded as dependent upon:

"(a) The number of sporozoites in the salivary glands.

"(b) The number of sporozoites discharged at each feeding.

"(c) The viability and longevity of the sporozoites in the glands.

"The loss of power to convey infection in this species of *Anopheles* probably depends on the elimination of the sporozoites from the salivary

glands through discharge or death of these organisms.

"In seventeen experiments in which human beings were employed to test the infectibility of *Anopheles punctipennis* with *Plasmodium vivax*, fourteen cases of malarial fever resulted. The sporozoites, in the mosquitoes used, developed ten to twenty-two days after the definitive hosts were given an opportunity to bite a patient harboring a scanty number of mature tertian gametocytes.

"In an attempt to infect several persons with a single specimen of *Anopheles punctipennis*, one mosquito proved to be the sole infective agent in one experiment and one proved to be the sole infective agent in three experiments. These two specimens, when applied to the same person, transmitted the infection in five cases, while one of them used with a third mosquito succeeded in infecting four persons.

"In these experiment alinoculations it was demonstrated that in nine instances in which two mosquitoes succeeded in transmitting malaria at least one of the pair was proved to be capable of causing the disease when used singly.

"It was demonstrated in eleven experiments that short exposure to bites was sufficient to cause successful transmission of the disease.

"In all of the successful inoculations only tertian infection was reproduced. *Plasmodium vivax* was demonstrated microscopically."

*

"The Need of Uniform Health Regulations in the Southern States.—Dr. D. W. Jones puts forth a splendid plea for uniform health regulations in the *Southern Medicine* for September, 1916.

"A careful comparison," says Dr. Jones, "of the health regulations of the Southern States shows such a striking similarity that one is forced to ask why we cannot have a uniform set of rules and regulations. Why cannot the Southern Medical Association appoint a commission to draw up such a plan as would be acceptable to all the Southern States, at least in its basic features?"

"Take, for illustration, the matter of inter-

state travel. The regulations in regard to spitting, cuspidors, sweeping, sleeping, the conduct of railroad authorities in the case of contagious diseases en route, reporting, detention, disposition of infected cars, disinfection, etc., should be the same in every state.

"All these matters are covered in a general way by the Federal regulations, but many of our states have additional regulations. Why not all have the same? We should have uniform regulations as to interstate quarantine, uniform restrictions as to travel, detention, certification of health; also as to domestic quarantine, length of time children should be kept at home after various contagious diseases, uniform penalties for false certificates, uniform rules for reporting contagious diseases, and penalties. We should have uniform regulations as to maritime quarantine, detention at ports, inspection, docking, unloading, disinfection of ships, examination of sea-faring men, and reporting sickness of such after going ashore. The Southern States should have an agreement as to reporting in good faith all contagious diseases, after a uniform plan, to the several state boards.

"These matters are necessarily under Federal control to a considerable extent, and the more we leave interstate traffic to the Federal government the better it will be in my opinion. But since the interstate and local regulations must necessarily intervene to some extent, it seems that we might have a commission composed of, say, one representative from each state and one from the United States Public Health Service. Care could be exercised in considering the relations between the state and Federal authorities, and some things could be left to individual states that have unique conditions. This commission could invite the railroads to send representatives to its conferences and thus guarantee their hearty co-operation with any regulations governing transportation. The general rules would of course have to be sent to the individual states for ratification by their state boards. But the fact that they had a representative in the conference would go a long way toward assuring their acceptance."



Motion Pictures and Eyestrain.—"Will frequent attendance at the movies affect my eyesight?" This is the question put and answered

by Gordon L. Berry in the August *Bulletin of the Department of Health of the City of New York*.

"To that question, there are two answers: First—'Motion pictures with defects of photography, manufacture and projection apparent, may prove injurious to eyesight,' and second—'Eyestrain caused by viewing motion pictures may indicate a subnormal condition of the eyes which should demand immediate attention on the part of your physician.'

"There has never been an extensive study made of the subject, but occasional investigations by interested oculists, illuminating engineers, et al., have developed conclusions which time is proving logical, and which are coming to be generally accepted. Their studies have been in large part based on a few well-known principles relating to illumination and eyestrain, and proceeding on the theory that motion pictures *may* be a source of eyestrain, let us see what may be the causes, and the methods of prevention. The chief points involved are:

"1. The effect of glare from a poor screen as the result of improper radiation from the screen.

"2. The general surrounding illumination of the auditorium.

"3. The position from which the spectators view the pictures.

"4. More serious than any of the foregoing possible causes is the 'flicker' of the films.

"5. The effect of constant prolonged concentration.

"It is not the purpose," says the author, "to frighten the habitue of the popular picture houses, but rather to reassure him to the effect, that, if all conditions are as nearly ideal as it is possible for them to be, there is not much danger of serious fatigue resulting from a moderate attendance at the silent drama. If, under such suggested conditions, however, there are evidences of eye fatigue, such as headache, smarting or itching of the lids, sensitiveness to light, excessive flow of tears, or if circles of light seem to appear on the screen—one should lose no time in consulting an oculist. The trouble evidently is not with the pictures, but with the individual, and Nature is sounding her tocsin of alarm in time to make it possible for him to remedy the trouble if he will but give it attention. Indications of serious diseases of the eye,

like glaucoma, which will result in blindness, if neglected, may thus be recognized and treated in time."



The Rat and Infantile Paralysis.—An extremely interesting statement of the case against the rat in the spread of infantile paralysis appears in the *Boston Medical and Surgical Journal* of September 21, 1916, by Dr. Mark W. Richardson of Boston. Dr. Richardson presents his arguments in two ways:

"First, those arguments which militate against the transfer of infection by direct or indirect human contact, and, second, those which support the theory that the disease is transmitted by rats or other rodents, by insects on the rats or rodents, or by both in combination."

"If, now," he goes on to say, "we take the rat and its parasite, the flea, as the hypothetical agents in the transmission of infantile paralysis, how does this assumption fit the epidemiological facts?"

"1. The rat has a world-wide distribution.

"2. It is found in habitations of all classes of the community, rich as well as poor.

"3. In the winter time the rat keeps largely to its hole, coming forth in the spring with the advent of warm weather and the growth of appropriate food.

"4. Although statistics are unavailable, it seems highly probable that rats are more common in the country, at least in proportion to the population, than they are in the city. In any event, it is not unreasonable to suppose that in ordinary country barns, out-houses, etc., the exposure to rat influence is much more marked than it is in the city where the houses are better built and where sewage and other sanitary provisions are much more complete. In any event, the children are constantly in the barns and numerous cats and dogs might convey infected fleas to the houses. Incidentally, the cats and dogs might become infected. This increased exposure to rat influence might, moreover, explain the higher percentage of adult infection in rural districts, noted by Frost.

"5. The great increase in poliomyelitis during the last twenty-five years has been explained as due to the great increase in facility of transportation all over the world, so that infinitely increased human contact has become possible.

The same argument would apply, however, to the transfer of infected rats from one locality to another. Indeed such transfer in freight cars and ships carrying grain, cattle, pigs, etc., must be common. This brings us to another consideration.

"6. That the relation to the railroads of cases of infantile paralysis has been noticed by a number of observers. Nothing could be more probable than that children living near railroads should play in rat-infected freight cars. Infected rats, furthermore, if dropped from freight cars, would necessarily seek their food in the immediate neighborhood. A possible case in point was that of a young college student who contracted infantile paralysis during his summer occupation as a freight brakeman.

"7. In the study of the epidemiology of infantile paralysis, it has been a common observation that (a) the disease occurs in foci; (b) in general, the cases spread more or less radially from centres of infection, and (c) the intensity of infection rises in one neighborhood while it is decreasing in a focus in its immediate vicinity. Such a fact is hard to explain through human transmission, which should result in the irregular distribution of cases, but is perfectly consonant with a gradually spreading infection of rodents.

"8. It has been noted above that districts severely affected by infantile paralysis are rarely affected again for a considerable period of time and that the Swedish observers have attempted to explain this fact by the assumed occurrence of a far-reaching immunization of the general human population. I have already pointed out that such a theory would be tenable only if adults were markedly subject to the disease. I believe, however, that such a local geographical immunization might well be possible through extensive infection affecting primarily not the human, but the rodent population. With the immunization of the rats, the human epidemic must necessarily cease. Whether such an immunity exists and can be transferred from adult rodent to offspring must be determined by experiment.

"9. In the transfer of the infection from the rat to man, the agency of the flea is assumed, although the possible contamination of food by rodent excretions might well be considered. The

insect transfer might be simply mechanical or it might require a preliminary cycle of development of the virus in the flea. Furthermore, the possible rôle of cats, dogs, and other animals, or even human beings, as carriers of infected fleas, would be apparent. Moreover, in grossly unsanitary surroundings, the fleas might carry infection from one child to another directly.

"The foregoing theoretical considerations have been put forward as explaining better than any other hypothesis as yet submitted, the epidemiological facts as observed in infantile paralysis.

"The human contact theory cannot be made to fit these facts except by efforts so extraordinary that the value of the theory is thereby practically destroyed."



The Sewage Pollution of Streams.—"In every inhabited country," says Dr. W. H. Frost in the *United States Public Health Report* for September 15, 1916, "the surface waters almost inevitably become more or less polluted with human excreta, but gross pollution of large streams, such as is now frequently encountered, results only where people are congregated in cities, discharging their wastes directly into watercourses through sewers, and these conditions are of comparatively recent development. This is especially the case in the United States, where many of the large cities have sprung up within a few decades; but even in the more densely populated European countries conditions of stream pollution have become much more serious within the last fifty to one hundred years, with the development of sanitary sewerage.

"For the prevention of the nuisance resulting from gross sewage pollution various processes of sewage treatment have been devised. These processes differ widely in their details, but all have two principal objects—the removal of solids and more or less complete oxidation of organic matter.

"Experience has proven that these processes of sewage treatment with various combinations and modifications, are adequate for the prevention of the offensive nuisance resulting from excessive pollution of streams with raw sewage. The cost of such treatment, though considerable, is not prohibitive, and is being gradually reduced by further improvements in efficiency of methods.

"The diseases which may be and frequently are caused by drinking sewage-polluted water include typhoid fever, Asiatic cholera, dysentery, and various more or less well-defined forms of enteritis, as well as infections with animal parasites. Each of these diseases is caused by a specific organism and, with the exception of certain animal parasite infections, the diseases of this group are peculiar to man, not affecting the lower animals. The specific germs of these infections have apparently no other natural breeding place than the human body, and are found in nature only in the bodies and the excreta of infected persons.

"It is, therefore, accepted as one of the rudimentary requisites for conservation of the public health that public water supplies must be protected from such dangerous contamination.

"The difficulties of the situation are many. The cost of such sewage treatment as may be necessary materially to reduce the sewage pollution of large streams is the first difficulty. The community bearing an expenditure for sewage treatment to protect the water supplies of other communities does not itself receive the dividends from the investment in better protection of its own citizens' health; and for this reason such expenditures are likely to be opposed unless clearly demonstrated to be necessary. But obviously a dire necessity can be demonstrated in a specific instance only after conditions have already become so bad and continued so long as to have caused more or less extensive disaster; and this, of course, must not be permitted. The measures taken must be anticipatory and preventive, not remedial and delayed until after extensive injury has been done. They must therefore be in a sense arbitrary, sufficiently radical to maintain a wide margin of safety, and not so radical as to involve enormous expenditures without justification.

"The first requisite in the control of stream pollution to-day is, therefore, a closer and broader study of the conditions of pollution existing in the rivers of the country, of the fundamental factors that influence these conditions, and, above all, of their effects upon health. Without such studies there can be no accurate knowledge as to the necessity for remedial measures and no reliable estimate of the influence of proposed measures in protecting the

public health. In the meantime it is hardly to be expected that the public will be willing to invest enormous sums for the improvement of stream-pollution conditions without knowing what returns may be expected from their investment. It is not sufficient merely to state that there will be 'some' returns in the saving of life and health; it is necessary to prove the assertion and, if possible, to show the extent of the saving in definite terms. The development of a universal sentiment in favor of water-purification plants must be credited chiefly to the definite proof of their efficiency in saving health and life. Similar proof will win equal approval for any further measures that may be required."



Sanitary Survey of a Trial City Block.—"While labor organizations and other departments have paid special attention to factory conditions with regard to sanitation they have neglected to a very large degree office conditions." This statement indicates the very great sanitary value of the study recently made in New York under Dr. Marion B. McMillan and reported in the monthly *Bulletin of the Department of Health of the City of New York* for August, 1916. The sanitary survey included the "sanitary" condition, lighting, ventilation and social conditions of workers employed in the office buildings located between Broadway, Nassau, Cedar and Liberty Streets.

"The block, as a whole, is typical of those found in the financial district. It contains a building of the oldest type, a building of a slightly more modern type, a building of a still more modern type, and also a building in which has been attempted the most sanitary up-to-date installations possible. In these buildings divers industries are carried on, and in all of them similar conditions exist to which the office worker is subjected.

"The most important points which were to be considered in this survey were recorded on a specially made report card. These report cards included three forms: 1, An Office Block Record; 2, An Office Building Record; 3, An Office Suite Record.

"An extensive and minute survey was made regarding the light on this block. The tests were made with a Macbeth illuminometer. The read-

ings were taken several times, in order to insure accuracy, and the machine was standardized daily before any readings were made in order to avoid any possible errors. The results of the use of this instrument were eminently satisfactory. The conclusions which were drawn from the numerous observations made may be stated as follows:

"Artificial light is used very generally for the purpose of illuminating the offices. This fact is not only true of offices located on the lower floors and inside of offices, but offices that are located on the uppermost floors. The percentage of employes on this block, using artificial light, was found to be 85.33 per cent., and that of those who were using natural light was only 14.67 per cent. When it is considered that the above figure of 85.33 per cent. represents the number of employes who are continuously subjected to artificial light, it would be well to stop and consider what the effect might be on a human being living continuously under such artificial conditions.

"What struck one most forcibly in the survey of this block was the fact that great attention had been paid to the aesthetic effects in lighting both the buildings and offices. Great skill had been shown, in many instances, in installing expensive electric fixtures for the purpose of display, but little or no attention had evidently been paid by the engineers regarding the physiological effects resulting from their installations.

"It may be stated, as a general conclusion, that the ventilation throughout this block is unsatisfactory for the reason that:

"1. The heights of the buildings surrounding and composing this block have a tendency to create strong currents of air, both in air-shafts and in streets adjoining the block. The individuals inhabiting these offices avoid opening the windows during cold weather on account of the drafts produced by so doing, as well as on account of the temperature. It is common to find, therefore, offices absolutely sealed from outside air.

"2. Inside openings, such as transoms, etc., exist only in a few instances, and where they do exist, are not in use.

"It might be advantageous to ventilate an office building through the hallways, the air being properly heated before being introduced

into the office. Where mechanical ventilators of an individual type, run by electricity, have been installed, the results have been extremely satisfactory, especially in those devices where the air is heated.

"It will be impossible to enforce a standard regarding ventilation until fresh air can be introduced in sufficient quantities and at a given temperature.

"At present, should the Department of Health enforce a standard, it should be one of quantity and temperature.

"Temperature: The average temperature of the buildings throughout the block was found to be from two to three degrees too high, taking as a limitation 70° F.

"Humidity: The humidity in the office buildings of this block showed that a great lowering in relative humidity takes place under conditions of artificial heat. This amounts to from 62 to 66 per cent., when compared to the relative humidity of the atmosphere surrounding the

buildings. The conclusions drawn from the relative humidity observations made show distinctly the fact that an enormous reduction in water vapor in the air takes place. The office worker is subjected to a temperature, as a rule, from 70° to 72° F., with a relative humidity of from 21° to 43°. When it is considered that the outside temperature, through the winter, ranges from 10° above zero to 54°, with an average, say, of about 40°, it will be seen that a person is subjected to change of 30° in temperature, and about 26° in humidity, the moment that he leaves the office and goes out into the street. There is no doubt that this rapid change of temperature and humidity is largely responsible for catarrhal conditions of the naso-pharynx. Excessively dry air has an irritating effect upon the mucous membrane of the nose and throat. If we add to this its high bacterial content, which is found when people are crowded together in an office, it is no wonder that morbidity rates are high in some of our office buildings."

Industrial Hygiene and Sanitation.

Health Conditions in the Cotton Mills.—It appears to have been necessary for the Massachusetts Child Labor Commission and State Board of Labor and Industries to secure the assistance of the United States Public Health Service in obtaining information concerning the physical condition of minors at work in the various cotton mills of the state.

The result of this investigation is a government publication in the form of a public health bulletin, "Influence of occupation on health during adolescence," and is a report of the physical examination of 679 minors under eighteen in the cotton mills of Massachusetts. The report is by Victor Safford, Assistant Surgeon, United States Public Health Service, and as far as it goes, is interesting but because of the comparatively small number of boys examined permits of no definite conclusions, a fact evidently recognized by the author of the report.

"The only serious menace to health in the cotton mills is really atmospheric," yet even in that Doctor Safford's report is far from alarming. Before the international congress on tuberculosis held at Washington in 1908, the census

bureau prepared a report showing that of the total of 690 deaths due to pulmonary tuberculosis per 100,000 of population, the highest number was among the marble and stone cutters, and that deaths of mill and textile workers came thirty-fourth in the list of occupations. Doctor Safford's own investigation showed that including epidemic colds and various abnormalities which could not be attributed to mill conditions, 499 out of the 679 boys examined revealed no discoverable abnormality of the respiratory mucus membrane. "This alone," says Doctor Safford, "would seem to justify some doubt as to the harmfulness of ordinary cotton mill atmosphere to the human respiratory apparatus."

Doctor Safford states that, "So far as physical effects of usual cotton factory work in the State of Massachusetts on male minor employees are concerned the hazards in the industry practically are reduced to the possible effects on the minors of the atmospheric conditions of the mills, not merely on the healthy and vigorous but on those who may in some way or other be abnormal.

Such an investigation as this might have been

made of material value if it had but included inquiry as to the home conditions of those minors seen in the mills. It is probably fair to believe that a great number of employees seen by Doctor Safford come from parents who had also worked in cotton mills and in turn whose parents and grandparents had labored in the mills of this country and England. The influence of heredity and environment is strikingly shown in that class of boys examined by Doctor Safford and it is a fact that no investigation of this sort should be considered complete unless it considers, as well as the conditions under which the minor works in the mills, those equally important factors of home surroundings, environment and heredity influence.



Pennsylvania's Fatality Record.—Pennsylvania continues an unenviable record of fatalities in her industries from report received at the Department of Labor and Industries of that state. It appears that during the month of August 246 workmen were killed, the highest total of any month during 1916. The total killed and injured during the month was 23,817, a daily average of 882. It further appears that there were nearly as many fatalities in the industries of that state during the first six months of 1916 as during the whole of the year 1915. To be specific, 1,136 workers were killed from January 1 to July 1, while the total fatalities for 1915 were 1,203. All casualties, fatal and otherwise, numbered for the first six months 121,180, while for 1915 they totaled but 61,540.

While this sad showing may in part be due to the fact that a larger number of persons are now employed in Pennsylvania than ever before, it is nevertheless a significant commentary on the failure of "Safety First" measures when these are set aside in the rush for gain in boom times.

Other states than Pennsylvania have during the past year shown a marked increase in the number of fatal industrial accidents reported, an increase that can by no means be accounted for by the increase in persons employed. It is highly probable that until definite standards of safety work are adopted by the various states, standards not general but specific, for the various industries, an increasing number of accidents, fatal and otherwise, will be reported to those State Boards in whose hands the administration

of preventive measures lies. It is not sufficient that this, that and the other manufacturing establishment may rely upon its own pleasure to diminish accidents within its own walls. It is not sufficient to rely upon the regulations or requirements of insurance companies covering liability risk. It is by no means sufficient to rely upon suggestions of self appointed counsels with enthusiasm far at variance with their experience. Here, if anywhere, lies an opportunity for the American Public Health Association, through their section on Industrial Hygiene, to establish safety standards through committees for the various industries, to see that the standards have the elements of common sense, and, most important of all, to suggest some way in which the standards may meet with proper enforcement by state authorities.



Health Insurance in Wisconsin.—The Wisconsin Federation of Labor, at its recent annual convention, voted to conduct a vigorous legislative campaign next winter, and the American Association for Labor Legislation is out with a model bill which it announces will be introduced into more than twenty state legislatures next January.

Briefly stated, the model bill of the association provides universal insurance against sickness for all manual workers and all others earning less than \$100 a month. Benefits include medical treatment and medicines, as well as a cash compensation equal to two-thirds of wages during sickness, but not to exceed twenty-six weeks in any one year. There is also a burial benefit of \$50. Contributions are to be paid in equal amounts by employers and employees, and the state will add one-fourth to the total as its share, and will supervise the funds which are to be mutually managed. Careful students of the subject declare this plan will result in a "Health First" movement equal in importance to the "Safety First" campaign which followed the enactment of workmen's compensation laws.



Health Conservation in Mining Industries.—The United States Bureau of Mines, Department of the Interior, which has in the past been mainly interested in the reduction of deaths by accidents among men connected with the mining industries, has broadened its scope to include the health of the men and has just issued a

report on health conservation at steel mills. This report, while especially prepared for the benefit of the men who toil in the great steel mills, contains advice of direct value to every one of the 30,000,000 workers in the United States and also to all employers of labor.

"The importance of the prevention of disease among workers can be realized from the fact that the average loss of time due to illness among approximately 30,000,000 workers in the United States is nine days a year," says Surgeon Watkins. "If medical attention be estimated at one dollar a day and earnings at two dollars a day this loss amounts to nearly \$880,000,000 annually.

"The statement that a man whose health is below par has a working efficiency below par should need no explanation. Efficiency of the workman is a subject no operator can afford to ignore, for, after all, industrial efficiency depends on the man behind the machine. Aside then from its humanitarian aspect, the prevention of conditions productive of ill-health is a plain business proposition."



Bonus for Ford Employees.—A bonus of \$850,000 was distributed recently among the 1,399 foremen and department heads of the Ford Motor Car Company as their reward for service and results obtained throughout the year.

Each man who shares in this bonus will receive from \$100 to \$1,000 as a reward for his length of service, efficiency and usefulness to the company.

Of the 1,399 men who will share in this bonus, 231 are in the branch offices and factories, 100 in the main office and the remainder in the main shops.



"Safety First" for Munition Mills.—To secure better conditions of safety in those plants engaged in the manufacture of munitions a conference was held in Philadelphia during September to standardize methods and reduce risks in the manufacture of explosives.

The code as proposed regulates the clothing that a workman in a munitions plant shall wear and oversees his habits. It provides that no man with the smell of intoxicating liquor on his breath shall be allowed to enter a munition factory. Men are not allowed to chew tobacco

while on duty. No steel of any kind is allowed in their shoes or in their clothing. Match inspection twice a week at irregular intervals is called for to prevent the smuggling of matches into the plants. Among other suggestions for safety the code asks that reflected light be sent into the room from an outside source when work must be done at night.



Self-Preservation.—Self-preservation is the first law of nature.

Self-preservation is instinctive in man and animals. When seeing a known danger, the impulse is to avoid it. Some animals are provided with an armor of shell for their self protection; some take refuge in flight and some by their own strength make defense. Man, in addition to having the senses of sight and hearing, has a brain trained to recognize danger which when known is generally avoided.

By frequently placing ourselves in danger and escaping injury, our minds become calloused and dangerous practices continue until eventually some one gets caught. What we should do is to keep our minds active in the safety cause and thus avoid letting them get calloused by long years of indifference. *Accidents do not just happen, but are made*, or the condition is made that causes them, and we all therefore should see that these conditions do not exist. The safety movement is for this sole purpose. The greatest factor operating toward the prevention of accidents is not the prevention device but the prevention spirit.—*Ex.*



Test Compensation to Posthumous Children.

—Payment of compensation to almost one thousand orphans will rest upon the result of an action brought in Pennsylvania against one of the large insurance companies of the country.

The compensation board had decided that a child, born six days after its father's death, was entitled to compensation until she became sixteen years of age. The insurance company took exception to the finding and has taken the case to the courts, where it now rests.



Employees Bonus at Saxon Company.—Each office employee who has been with the Saxon Motor Car Corporation for over ninety days has received a bonus of five per cent. of the

salary received during the year or for the term of employment if less than a year. Each factory employee shared on a like basis with those in the office department, except those who have been paid on piece-work basis and these have received a bonus of three per cent. These payments were made on September 1.

President Ford states, "This does not bind the company to a policy of bonuses each year. It is hoped that the payment of this bonus will encourage each employee to study his work to the end that each one may increase his efficiency." "While this first bonus is paid on flat percentage in the future a record of each individual employee will be taken into consideration. Punctuality, carefulness, obedience to all company rules and regulations, loyalty, willingness to coöperate with the desires of the management at all times will be taken into consideration in payment of any bonus that may be decided upon in the future."



Ninety-Two Laws Passed to Aid Labor in One Year.—Ninety-two statutes beneficial to labor were made law by Congress and the various states according to a survey made public on September 4 by the American Association for Labor Legislation.

Most significant were the Federal statute prohibiting the shipment in interstate or foreign commerce of the products of child labor and the other providing a model scale of workmen's compensation for personal injuries among Federal employees, of which there are more than 480,000.



Compensation Act a Success in Pennsylvania.—Announcement was made on September 11 that out of 50,000 cases in Pennsylvania involving workmen's compensation only eleven were taken to the courts for final settlement.

Forty-nine thousand of the cases were decided without recourse to other means than the mere conference between employer and employees. Less than 900 were settled by referee and 107 were adjusted by the Compensation Board.



Tuberculosis in Trades.—A study has recently been completed by surgeons of the

public health service of tuberculosis among the industrial workers in one of the large cities of the country. As a result of that study it is estimated that probably a percentage as high as 19.3 of tuberculosis is due to occupational hazards and to working conditions.

These hazards are not inherent in the occupation but are due to harmful influences which may be removed. The elements of poverty and poor housing conditions are factors intensifying this disease.

One hundred and fifty-four establishments and 19,932 employees were covered. Among the entire number 220 cases of tuberculosis were discovered.

The report recommends for relief the institution of state industrial insurance and the improving of housing conditions among employees.



Model Houses for Workers.—The Westinghouse Electric & Manufacturing Co., will shortly begin the erection of hundreds of model houses for employees. These houses will be along lines laid down by some of the foremost experts on small homes in the country. They will be built under contracts calling for the erection of 100 houses and eventually there will be 600 in the group. It is expected that the plan will become a model for all industrial communities.

The houses will be of four, five or six rooms and will contain every modern convenience. All streets and avenues will be parked and shade trees will be planted. The general idea is to make the surroundings pleasant and the rentals such that it will be possible for any employee of the company to live in the colony.



Spinners Adopt Eight Hour Day Resolution.—At the closing session of the three days' annual convention of the International Spinners' Union of America recently, at 724 Washington St., district reports showed improved conditions with wages advanced from 15 to 20 per cent. since the last convention.

Forty delegates, representing 20 districts, attended. Resolutions urging a general eight hour workday for women and children and favoring health insurance were adopted.

Personal Notes.

Dr. William Davis, for many years vital statistician of the Boston Health Department, has been appointed Chief of the Division of Vital Statistics of the United States Census Bureau.

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Dr. L. D. Bristol, a graduate of Johns Hopkins, formerly on the faculties of Minnesota and Syracuse Universities, and for the past two years Professor of Bacteriology and Hygiene, and Director of the State Public Health Laboratories at the University of North Dakota, has accepted the newly created Boston Dispensary Fellowship in Public Health in the Department of Preventive Medicine at Harvard Medical School, Boston.

✻

Mr. Barnett Cohen, of Savannah, Ga., has resigned his position as Assistant Bacteriologist in the Health Department of Savannah to accept a position as Research Assistant in the Department of Public Health, Yale University.

Dr. Herbert R. Brown, assistant director of the Massachusetts State Department of Health, has accepted the position of pathologist to the Rochester Homeopathic Hospital, Rochester, N. Y.

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The following persons have been elected to membership in the American Public Health Association:

Albert Yates, M. D., South Main St., Washington, Mich., Physician, Surgeon.

Leon Gilbert Woodford, M. D., Everett, Wash., City Health Officer.

L. L. McDougal, B. S., M. D., Booneville, Miss., Physician.

Wm. Muhlberg, M. D., Cincinnati, Ohio, Life Insurance Co.

I. A. Abt, M. D., Chicago, Ill., Physician.

Wm. Scheppegegrell, M. D., New Orleans, La., Physician.

Harry B. Sears, M. D., Beaver Dam, Wis., General Practice.

Robert W. Love, Moorefield, W. Va., Health Officer.

Chester T. Butterfield, U. S. P. H. Service, Cincinnati, Ohio, Bacteriologist.

Harold H. Mitchell, State Board of Health, Indianapolis, Ind.

Benzion Liber, B. A., B. S., M. D., New York City, Physician.

Arthur W. Hedrich, Boston, Mass., Chemist.

Lawrence Stevens, M. D., Bridger, Mont.

Howard A. Streeter, M. D., Marblehead, Mass., Chairman Board of Health.

John R. Baylis, Jackson, Miss., Manager Jackson Water Works.

Charles F. Lynch, M. D., Lansing, Mich., Health Officer.

Paul H. Duff, S. B., Charlestown, Mass., Student at Harvard Medical School.

Wade Wright, M. D., Boston, Mass., Head of Industrial Clinic, Massachusetts General Hospital.

John J. Griffin, M.D., Sault Ste. Marie, Mich., Health Officer.

Robert G. Patterson, Ph. D., Columbus, Ohio, Assistant Professor Ohio State University.

Aaron P. Pratt, C. P. H., York Village, Me., Health Officer.

Charles A. Gardner, M. D., Columbus, Mont., Physician and Surgeon.

Margaret A. Rogers, R. N., Detroit, Mich.

Current Public Health Literature.

AMERICAN.

American City, New York.

XV. September.

A New Census Report of Municipal Statistics. The Water Supply of Portland, Maine. J. W. Graham. Housing in Massachusetts Towns. Gabriel Farrell.

American Journal of Diseases of Children, Chicago.

XII. September.

Scarlet Fever, Morbidity and Mortality. Based on Several Million Cases. H. H. Donnelly. Types of Pneumococcus Found in the Pneumonias of Infants and Young Children. Martha Wollstein and A. W. Benson.

The Epidemiology of Pertussis. Introductory. Paul Luttinger.

Observations on the Intradermal and Repeated Intradermal Injection of Diphtheria Toxin with Reference to the Schick Test. D. M. Cowie.

An Anaphylactic Skin Reaction to Diphtheria Bacilli. J. A. Kolmer.

American Journal of Nursing, Baltimore, Md.

XVI. September.

In Preparation for the New York State Examination. Jane E. Hitchcock.

Acute Poliomyelitis. Emma Moynihan.

A Sanitary Contrivance. Peter F. Quinn.

Some Suggestions for School Nursing in a Small Town. Amy F. Lowe.
Diseases of the Nose. C. R. C. Borden.

Boston Medical and Surgical Journal.

CLXXV. September 21.
The Rat and Infantile Paralysis. A Theory. Mark W. Richardson.
Some Medical Aspects of the Workmen's Compensation Act. Francis D. Donoghue.
The Major Divisions of Mental Hygiene: Public, Social, Individual. E. E. Southard.
What Recent Investigations Have Shown to be the Relation between Mental Defect and Crime. A. W. Stearns.
Idiosyncrasy of Cow's Milk: Its Relation to Anaphylaxis. T. B. Talbot.

Engineering News, New York.

74. September 2.
Double Tank Proposed for Residential Sewage Plants. W. S. Coulter.
September 9.
Local Water Tested by Laboratory on Wheels. J. H. O'Neill.
Special Devices Installed to Improve Operation of New Mechanical Filters. E. E. Harper.
Ideal Organization for Water Works Described.
September 23.
Water Works Practice Discussed at New England Association Convention at Portland, Maine, September 13, 14, and 15.

Journal of the American Medical Association, Chicago.

LXVII. September 16.
The Prevalence of Chronic Mouth Infections and their Management. F. B. Moorehead.
The Principles Involved in Local Infection as Related to Systemic Disease. Frank Billings.
Dental Infections and Systemic Disease. E. E. Irons.
Direct and Indirect Hay Fever. W. Scheppegegrell.
The Interest of the Community in Cancer. Louis I. Dublin.
Comparative Results in Antirabic Treatment with the Pasteur Method and with Desiccated Virus. D. L. Harris.
Colonic Infections: Some Rarely Observed Unclassified Types. J. M. Lynch and W. L. McFarland.

Medical Times, New York.

XLIV. September.
Should Terminal Infection be Abolished. R. H. Creel, L. R. Williams, H. W. Hill, C. S. Caverly, J. D. Robertson, J. S. Neff.
The Vagaries of Boards of Health. R. W. Wilcox.

Journal of State Medicine, London.

XXIV. September.
The Disposal of Human Excretor in the Tropics. Angus MacDonald.
How to Save the Teeth of Children. J. H. Gibbs.

Medical Officer, London.

XVI. July 29.
The Statistical Evidence of Cancer Increase. F. L. Hoffman.
August 5.
The Treatment of Syphilis by Salvarsan, Galyi, and Kharsavan. C. S. Thomson.
August 12.
War and Lunacy.
Adenoids and Physical Defects in Children. H. R. Burpett.
August 19.
Children's Care Work in London.

The Detection and Control of Typhoid Carriers of Disease. F. M. Meader.
The Menace of the Biting Stable Fly. J. W. Redway.
Food and Feeding in Infancy. J. Epstein.

New York Medical Journal.

CIV. September 2.
The Preëxisting Condition of the Injured. (To be concluded.) G. R. Doré.
The Resuscitation of Persons Apparently Drowned. J. O. Carrington.
Effective Sewage Disposal. Editorial.
September 9.
Tuberculosis in Relation to Feeble-mindedness. Peter H. Bryce.
Dysentery in Serbia. J. Rudis-Jicinsky.
A Test for Syphilis. G. B. Ubel.
Drug Addiction. E. W. Marlan.
The Relation of Diet to Diseases of the Skin. Albert Strickler.
September 23.
Occupational Specialization in the Defective. H. M. Friedman.
The Problem of Adolescence in Relation to Social Hygiene. H. W. Wright.

Safety Engineering, New York.

XXXII. September.
Fire Hazards of Ammunition Manufacture. W. B. Milne.
Central Safety Stations in Coal Mines. H. M. Wilson.
The Real Meaning of "Safety First." John Annal.
The Power to Order Structural Changes in New York Factory Buildings.
The Statistician or Rate-Maker. A. C. Hendrick.
Safety Work in Gas and Electrical Industries.

Southern Medical Journal, Birmingham.

IX. September.
Operation of Vital Statistics Law in Arkansas. C. W. Garrison.
Registration of Births and Deaths in Dallas, Texas. E. B. Summers.
Vital Statistics Vitalized. W. L. Helzer.
The Need of Uniform Health Regulations in Southern States. D. W. Jones.
Symposium on Vital Statistics. Discussion.

United States Public Health Reports, Washington.

XXXI. September 1.
Poliomyelitis. Its Interstate and Intrastate Control. Anopheles Infectivity Experiments. M. Bruin Mitzmain.
September 8.
Poliomyelitis.
September 15.
The Sewage Pollution of Streams. W. H. Frost.

BRITISH.

The Causation of Dental Decay.
September 2.
Housing and Town-Planning, 1915-1916.
Bacteriology and Present Status of Specific Treatment of Pneumonia. Rufus Cole.
September 9.
The Public Health Service as a Career. John Robertson.
Degrees and Diplomas in Public Health.

Public Health, London.

XXIX. September.
Hygiene and Public Health: Some Needs of Post-Graduate Teaching and Training. H. R. Kenwood.
The School Medical Officer and the Tuberculosis Officer. Frank C. Shruballs.
Acute Epidemic Cerebro-Spinal Meningitis. C. S. Thomson.
Meat Inspection. William J. Howarth.

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SOME IMPORTANT PUBLIC HEALTH PROBLEMS.

ANNUAL ADDRESS OF THE PRESIDENT OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.*

JOHN F. ANDERSON, M. D.,
New Brunswick, N. J.

FELLOW Members of the American Public Health Association, Ladies and Gentlemen: The time allotted me by the local Committee of Arrangements is not sufficient in which to discuss adequately some single phase of public health work. For that reason I have chosen to bring before your attention this evening in outline several matters that seemed to me among the most important connected with public health administration in this country.

Before doing so, I desire to report to you concerning the general welfare of the Association and of its JOURNAL. As most of you know, this is the 44th Annual Meeting of the Association. The membership of the Association in 1872, the year of its organization, was 63; our membership on September 1, 1916, was 1,647. The number of members did not reach 700 until 1910, except for a temporary increase to about 1,200 in 1893, following the meeting in Mexico City. Between that temporary increase in 1910, it fell at one time to less than 500. In

1911 the membership began to rise and in that year reached 800; since then the number has rapidly mounted, and on September 1 of this year had reached 1,647. It is recorded in the transactions of the Association that 17 members were in attendance at the meeting in 1873 out of a total membership of about 80, while that number would be counted as hardly a quorum at any single one of this year's section meetings. The rapid growth in the membership in the last four years convinces me that if some way could be provided to put at our disposal a small amount of money to be used for developing membership, we should in a short while have on our rolls 5,000 members.

The JOURNAL has also shown a healthy growth: the net paid circulation on September 1, 1914, was 1,544; on September 1, 1915, it was 1,701; September 1, 1916, it was 2,413, a percentage increase of 41.8 per cent. over 1915.

Our activities up to this time have been largely devoted to holding our annual meeting, the publication of the JOURNAL, and the preparation and distribution of standard methods par-

* Delivered at Cincinnati, Ohio, October 24, 1916.

ticularly those prepared under the auspices of the laboratory section. I believe the time has now come when we should greatly broaden our activities and begin to really serve as a clearing house for health information, and perhaps even enter the field of health propaganda.

We should increase the number of sections in the Association so that a place may be provided for those who specialize in particular fields of sanitary science in which to meet to give and receive the results of work by specialists in certain branches of sanitary science.

THE FULL-TIME HEALTH OFFICER.

To those who have given attention to the administrative problems of public health work, it has become increasingly evident that the most important element in effective public health administration is the full-time, local health officer. He is the immediate cog in the mechanism of public health administration that bears directly upon the shaft around which revolves the machinery of public health as it affects the community and the individual.

We may have a thoroughly trained and well qualified executive at the head of the state health organization, who is provided with competent assistants in charge of the various departments that pertain to a well balanced and effective state department of health. The state health laws and regulations may be ample as regards scope and power. There may be appropriations of reasonable amounts, sufficient for carrying on the work of

the central office. There may even be a distinct public sentiment among the citizens of the state in favor of the enforcement of health measures, but these agencies cannot be utilized to their full value unless there is provided, either by the state organization or by the individual communities, a trained, full-time health officer, for it is the local health officer who has to deal with the individual health problems of the community, who has to solve those problems when they arise, and who has to take the necessary steps to avoid their recurrence. He must not only be a man qualified by education and training for the duties of his office, but he must be a man with tact to minimize the opposition to the enforcement of health measures, without abating in any way their enforcement. In my opinion, it is not necessary that the local health officer should be a physician, though it is desirable if he possesses the other necessary qualifications. It is essential that he should be a full-time officer: this is more essential than a degree of Doctor of Public Health, for a man (even though he has not had a thorough education in public health, desirable as it may be) who is able to give his entire thought and time to the duties of his office, can accomplish more for his office and be of more real service to his community than the part-time health officer, with the consequent division of his thoughts and energies.

COÖPERATIVE PUBLIC HEALTH ADMINISTRATION.

The administrative health organization of most of our larger cities and

some of the smaller towns are on a fairly satisfactory basis, but that of many of the smaller towns and rural communities is far from satisfactory. The highly specialized character of public health work and the financial inability of the smaller communities to support an adequately equipped health organization are in large part responsible for this condition. That neither of these conditions is insurmountable has been shown by the coöperative studies in health administration conducted in Massachusetts and in Illinois. Both Phelps and Rudiger have shown that a number of small communities may combine their resources and obtain by a system of coöperative health organization results which demonstrate that it need no longer be said that the health officer of our smaller communities is the least efficient unit of our health organization.

APPLICATION OF KNOWN FACTS IN THE CONTROL OF DISEASE.

Some students of public health administration have occasionally called attention to the tardiness with which administrative health officials put into practice measures for the control of disease based upon the result of research into their cause and method of transmission. This applies not only to the control of diseases after they have assumed undue prevalence in a community but to the prevention of the entrance of diseases into a hitherto non-infected locality. Examples of this delay in the application of laboratory results to practical public health procedures are numerous as shown by

the history of the control of yellow fever, malaria, bubonic plague, typhus fever, cholera, and even of typhoid fever, the most studied, and still one of the most prevalent of our endemic infectious diseases. It has been known for at least fifteen years that bubonic plague is primarily a disease of rodents, and only secondarily of man, and that the disease is carried to man by infected fleas. While these facts have been common knowledge even to the laity, they have been practically disregarded by every city in the United States, except sporadically, so far as the putting into effect of measures for the destruction of rats and even of the exclusion of possibly infected rats from places in the United States in which bubonic plague is present. New Orleans in all probability would have avoided the loss of life and the great financial loss to the city and its citizens if it had applied, previous to 1914, those measures known to be effective in plague prevention. What has happened in New Orleans may happen to other cities.

We know that malaria is transmitted by certain mosquitoes and that the reservoir of infection is largely composed of persons without clinical evidences of the disease, yet how many communities in endemic foci of the disease in this country are enforcing scientific anti-malarial measures based upon this knowledge?

We know that honest tuberculin testing of cattle practically insures milk free from tubercle bacilli, and we also know that proper pasteurization of milk saves lives and prevents sickness, yet how few are the localities in

which there is enforced adequate tuberculin testing of milk cattle or efficient pasteurization of the milk supply.

Other examples could be cited even more striking in that they show how slow the administrative branch of public health is to apply to disease prevention the measures so patiently worked out by the research workers as regards the control and prevention of disease, not only of the contagious diseases, but of those other large classes of diseases about which we have been learning so much in the last few years. I, of course, refer to the so-called industrial diseases and diseases of nutrition.

There can be no question as to the importance and desirability of research and it should be encouraged and promoted in every way, but if all research was stopped and application was made of our present knowledge that pertains to the prevention of disease, the death-rate would be cut almost in half.

THE INTERSTATE AND INTRASTATE CONTROL OF THE MILK SUPPLY.

It will be generally conceded that milk is a more important factor in the spread of disease than any other element of our food supply, and that it may even exceed in importance our water supply as a disseminator of disease. We know how frequently milk has been shown to have been responsible for the spread of typhoid fever, septic sore throat and perhaps others: we do not know and cannot even surmise how many thousands have become ill or even lost their lives

through untraced infection in the milk. Some states and many municipalities have attempted to control this flood of infection pouring into our towns and cities from the country districts by inspection of dairy farms, and in a few instances by compulsory pasteurization of the greater part of the milk supply. It is familiar to all how unsatisfactory the present system of inspection has proved, and how costly it has been. We see in a state supplying milk to its own cities, and also to cities located in other states, inspectors not only from a number of cities within the state, but inspectors from other states, all traveling back and forth and crossing the track of each other in their travels. This inspection could not only be more efficiently conducted but it could be done far more economically if all of the inspections in a state were done by a corps of inspectors under a single head and working under uniform instructions. The federal government has not up to this time taken a decided part in safeguarding the milk sold in interstate commerce, though there are at least two Bureaus with jurisdiction. The Bureau of Chemistry has authority under the Pure Food & Drug Act, and the Public Health Service under the Interstate Quarantine Act has the power to prevent the shipment in interstate commerce of milk which may convey contagious diseases from one state to another. Under this broad power, the Public Health Service can prevent the shipment of milk from non-tuberculin tested cows and the shipment of milk from localities in which contagious diseases, the in-

fection of which may be transmitted by milk, are prevailing to such an extent as to render possible the spread of those diseases from one state to another. We thus see that this important factor in the spread of some of the contagious diseases—infected milk—may be controlled by the federal government, if the Congress provides the funds, just as the federal government controls the packing industry. For purely intrastate milk shipments the state should control the sanitary quality of the milk until it reaches the city limits. When it reaches the municipality the proper authorities should require that all milk sold should be efficiently pasteurized. There are those who are opposed to pasteurization for one reason or another, as they do not believe that pasteurization can be efficiently enforced, but the value of the procedure as a public health measure cannot any longer be questioned, and the practicability of its enforcement has been conclusively demonstrated in large and small communities.

MORBIDITY REPORTS.

There is one factor in public health administration which I wish to dwell upon for a moment because of its importance. I refer to the necessity for health departments having currently at hand accurate information of the prevalence of disease within their respective jurisdiction. If health departments have a purpose it is to prevent and control disease, and this is impossible, no matter what else they may do, or how great appropriations they may expend, if they have not knowledge of when, where, and under

what conditions cases of the preventable diseases are occurring. Whenever a serious outbreak of a communicable disease has appeared in modern times in any community and an earnest and intelligent effort has been made to combat the epidemic, the first requirement, and the most rigidly enforced, has been that all cases should be reported. The inference is unavoidable that in those instances where the notification of cases is not insisted upon the efforts at control lack in earnestness and sincerity. Every case of a communicable disease is a focus from which other cases may arise. Every case has its origin in some other focus which should be found. Of the diseases which are preventable, but not communicable, every case shows the existence of conditions which produce the disease, conditions which in most instances must be remedied to prevent similar injury to others and the occurrence of additional cases. Morbidity records are to the health department its chart and compass.

The reports of cases should not be considered as statistics although there is much of statistical value in them. Each report is a notification to the health department that a case of preventable disease has occurred and indicates the location of a focus requiring prompt attention. These reports should, therefore, be received promptly by the epidemiologist or that division having charge of the control of preventable diseases.

There is nothing which can take the place of these reports in showing the prevalence of disease and where it

exists. Disease is as widespread and as prevalent as are cases. Nor can it be any less prevalent or widespread than are cases.

After it has served the current purpose of showing the health department where it must act, the information contained in morbidity reports should be carefully filed and periodically compiled, so that there may be from year to year a record of the prevalence of disease and the conditions under which it occurred. Such records, when accumulated over a period of years, would furnish invaluable information to the epidemiologist and sanitarian. They would show the varying prevalence of disease from year to year and in different localities. They would indicate the cycles of prevalence and the epidemic waves.

Because of the importance of the subject to health departments and the obvious desirability for uniformity in public health laws and regulations of this kind, I wish to bespeak your careful study of the Model State Law for Morbidity Reports, adopted by the Conference of State and Territorial Health Authorities with the United States Public Health Service. This law is intended to be a model, embodying the essential principles of the subject. It was drafted primarily for enactment by the states. With but slight modification, however, it is suitable for enactment as an ordinance by municipalities. The list of diseases given may appear to some to be long, but, logically, in a model law of this nature, all the preventable diseases must be included. The law as adopted by states and cities might, however,

be made to include only those preventable diseases over which it was the intention of the health department to exert control. No health officer should be unfamiliar with the provisions of this model law.

INDUSTRIAL DISEASES.

The most important social change which has taken place within the last century is the tremendous development of industry. It is this development which has wrought such changes in man's environment and subjected him to a multitude of health hazards to which he was formerly a stranger.

In view of the constantly increasing numbers of the population who carry on our industries, the question of their health and the risks to which it is exposed is becoming a question of continuously greater national importance. While questions affecting the health of workers must ever constitute a part of the general problem of safeguarding the public health, it is a matter of regret that only in recent years have we begun to accord to it its full share of weight in national health problems. One needs only casually to consult the figures compiled by statisticians to become aware at once of the enormous economic waste which results from preventable illness affecting workers.

This group of the population numbers some 30,000,000 in this country. The average yearly loss for each individual of this group on account of sickness has been approximated at about nine days. This amounts to an annual loss of 740,000 years. In terms of dollars and cents, assuming wages to average \$2.00 per diem and medical

care and treatment \$1.00, this loss is about \$740,000,000.00. At least one half of this can be prevented. In this sum is not included the loss and suffering in the families of industrial workers because of the non-employment of the chief bread winner, nor is there any estimate made of the economic loss because of diminished productivity and curtailment of the year of active work of wage-earners because of the results of previous illness.

Again, statisticians are urgently calling our attention to the great increase which has taken place in the deaths from the so-called degenerative diseases. Figures are at hand which show that the death-rate from such diseases is higher by far among wage-earners than among the inhabitants of rural communities. We are all aware that modern industry has added many stresses to the life of those engaged therein. Long hours, monotony, fatigue, the speeding-up process, exposure to darkness, dampness and extremes of cold and heat, vibration, injurious industrial lights, poisons, fumes, and gases, uncertainty of employment, seasonal fluctuations of the industry, crowded and filthy homes, defective community environment—all multiply the strain upon the human organism so that it is no wonder, if the ravages of communicable diseases are escaped, that these other stresses upon the body produce the effect of throwing many lives upon the human scrap heap of industry, at an age when they should still be at the full tide of their productive powers.

Surely the prevention of industrial diseases, the general improvement of

industrial sanitation, and the mitigation of hazards to health inherent in industries is one of the first and most important tasks for the present generation. The end to be accomplished is that industry, per se, shall exert no harmful effects upon the workers engaged therein; that occupation in no industry shall shorten the period of productive activity of the worker. We have heard much of the present safety campaign to diminish industrial hazards. All of our efforts should be directed toward making industry safe in a large sense; safe from every standpoint, from the standpoint of health as well as from accident.

There is, therefore, the necessity for more intensive study of the health conditions surrounding our workers. All progressive manufacturers thoroughly realize that continuous health of workers is a stronger impetus to industrial prosperity than the most efficient automatic machinery and the most improved methods of production. What they desire, however, is specific information, how to make the industries safe from the health standpoint, and effective economic methods to this end. We as sanitarians should be able to furnish them this information. What is needed, therefore, is more intensive study of the sanitary environment of workers and the molding of public opinion toward a demand for their betterment.

HEALTH INSURANCE.

Investigations into the working and living conditions of the 30,000,000 wage-earners of the United States has revealed many things which are de-

plorable especially among the unskilled low-paid group of workers. In spite of recent improvement in many industrial establishments the fight against insanitary conditions is still an uphill one. Recent sanitary surveys show that the elimination of health hazards from industry is not a thing to be expected in the near future.

Of greater importance is the inability of a considerable proportion of the wage-earners of the country to maintain a healthful standard of living on the wages received. In all investigations the vicious circle of poverty as cause and effect of disease is found.

It is hardly necessary to tell members of this Association that the mortality rates are from two to three times greater among the families of the unskilled low-paid wage-earners than among the families of the well-to-do.

With the highest sick- and death-rate among the groups who are least able to meet the expense, it has become necessary to fix the responsibility for disease-causing conditions and make some provision whereby the responsible parties may meet this responsibility in an adequate and business-like way instead of leaving it to public and private charity.

It has been fairly well determined that three groups, employers, employees and the public are responsible to a varying degree for conditions causing disease among the wage-earning population.

The problem then is to place the burden where it belongs, and from the public health viewpoint, stimulate the coöperation of all concerned to prevent

disease. In many European countries the problem has been met by providing for health insurance systems supported and controlled by employers, employees, and the government.

Under these systems medical service together with a continuance of a substantial part of the wages is provided during the sickness of the wage-earner, so that he can afford to stop work when sick without leaving his family destitute. Maternity benefits are provided to conserve the health of the mothers and babies.

The joint contribution to the health insurance funds by the three groups gives to each group a financial incentive to reduce this expense by preventing sickness.

The joint support and control of the funds frees this method of relief from every taint of charity or paternalism and offers a common ground for capital and labor to coöperate for increasing the efficiency of industry and improving the health of the workers.

Just as accident insurance laws may be expected to stimulate a similar campaign for health.

It has not been much more than ten years since the agitation began for workmen's compensation laws (accident insurance), now 34 states and territories have such laws on their statute books. There is every reason to believe that health insurance laws will be the next important step in social legislation. Health insurance bills have already been introduced into three state legislatures and social insurance commissions have been established by two states to study this subject. A bill creating a social in-

insurance commission has been favorably reported by the Committee on Labor in the United States House of Representatives.

With the rapid progress in the framing of health insurance laws it is important that the American Public Health Association study this subject and present the best methods of correlating any proposed health insurance system with existing health agencies. At present none of the proposed bills contain any provision for disease-preventing machinery or provision for utilizing existing machinery.

The administration of the medical benefits seem to offer the best method for accomplishing this end. Some such plan has been adopted under the English National Insurance in working out the comprehensive plans for the relief and prevention of tuberculosis in some of the counties and county boroughs.

"To enact a health insurance law simply as a relief measure without adequate prevention features would be a serious mistake, but with a comprehensive plan for disease prevention there is every reason to believe that it

would prove to be a measure of extraordinary value in improving the health and efficiency of the wage-earning population."

When we adopt it in this country, let us by all means profit by previous experience, and use such laws as a basis not only for the purpose of relieving illness, but also for preventing it. As the cost of such insurance must be proportional to the incidence of disease, it seems evident that if part of the great funds thus collected are used in a prophylactic way for the purpose of industrial sanitation, the total cost of the insurance must be materially reduced. When, therefore, the question of adopting such laws comes up for discussion in various legislatures, let us as sanitarians demand that the prophylactic side of the question be given thorough consideration, and that the three groups primarily responsible for sanitary conditions affecting workers, namely, the industries, the general public, and the workers themselves, each assume their full share of responsibility in carrying such laws into effect.



HEALTH OF RURAL SCHOOL CHILDREN.

A recent investigation made by the U. S. Public Health Service in connection with studies of rural school children showed that 49.3 per cent. had defective teeth, 21.1 per cent. had two or more missing teeth, and only 16.9 per cent. had had dental attention. Over 14 per cent. never used a tooth-brush, 58.2 per cent. used one occasionally and only 27.4 per cent. used one daily. Defective teeth reduce physical efficiency. Dirty, suppurating, snaggle-toothed mouths are responsible for many cases of heart disease, rheumatism, and other chronic affec-

tions. The children are not responsible for the neglected state of their teeth. The ignorant and careless parent is to blame for this condition—a condition which hampers mental and physical growth and puts a permanent handicap on our future citizens. School teachers can and are doing much in inculcating habits of personal cleanliness on the rural school child but this will fail of the highest accomplishment unless parents coöperate heartily and continuously. This is a duty which we owe our children.

THE OCCURRENCE OF LIVING TUBERCLE BACILLI IN RIVER WATER CONTAMINATED BY SEWAGE FROM A HEALTH RESORT.

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THERE are many missing links in the etiologic chain in tuberculosis and this paper is the outcome of an attempt to supply from time to time some of these missing links. Several years ago a number of observers claimed that tubercle bacilli occurred in the feces of a large number of patients with pulmonary tuberculosis. We attempted to verify this and Laird and Kite, in the laboratory of the Trudeau Sanatorium, found that the feces contained viable tubercle bacilli in 90 per cent. of all patients with open lesions. We now question if this figure is not too low, for one of us (Petroff) found them in all of thirty-two cases examined and was able to cultivate them, which as far as we know, no one had done before, in 59 per cent. The ease with which guinea pigs could be infected with tubercle bacilli in the feces suggested that a study should be made of water of streams contaminated with sewage. The sewerage system of Saranac Lake at present empties into the Saranac River just below the village. Only four or five small houses in the whole village are not connected with this system. We studied the surface and deeper waters, and in some instances the mud, above and at the outlet of the sewer and at different distances down stream (200 yards, 400 yards, 2.9 miles—measured along a road

which does not closely parallel the river,—3.5 and 12 miles). These distances were determined by the occurrence of bridges across the river.

The flow of the stream was estimated to be about 2 to 4 miles per hour.

THE TECHNIC.

Large bottles were used to collect the water at the outlet of the sewer. To obtain the water at different levels the covering of the mouth of the bottle was left in place until the bottle was immersed to that level.

Further down the river a different method was used for studying the surface contamination. Strips or bags of sterile cheesecloth were attached to wires and stretched across the surface of the stream and allowed to remain in position from one to two hours, when they were put into sterile covered pails and carried to the laboratory.

The cloth was very carefully washed in sterile water. The wash water was then put into wide mouthed bottles, saturated with NaCl and let stand in the dark for several hours. At the end of that time the scum was collected with sterile spoons and transferred to 50 cc. centrifugal tubes. Ten cc. of normal NaOH was added to each tube which was incubated at 37° for one-half hour. The contents of the tubes were then neutralized with normal HCl, centrifugalized, and part

of this sediment was studied microscopically, part inoculated into egg media, and part injected into guinea pigs.

THE CULTURES.

All the cultures were contaminated, due very likely to the presence of many moulds and spore-forming organisms in the river water. At this time the gentian violet media (Petroff) was not in use.

THE MICROSCOPIC STUDY.

Every smear preparation but three, taken from below the surface, from the outlet of the sewer to a point 3.5 miles down stream, showed the presence of acid-fast organisms. No acid-fast organisms were found above the outlet or 12 miles below the outlet.

THE INOCULATION OF GUINEA PIGS.

Our work upon the feces does not incline us to believe that acid-fast organisms other than tubercle bacilli occur frequently in the feces of tuberculous patients, for under certain conditions we have been able to infect guinea pigs in nearly every instance where we found acid-fast organisms in the feces of tuberculous patients. It will be noted from the table that acid-fast organisms occurred in most of the specimens, less often deep in the water than upon the surface as far at least as 3.5 miles from the mouth of the sewer. Unfortunately the next point at which we judged we could study the water was at least 12 miles below the sewer's outlet. Here no acid-fast organisms were found, but colon bacilli occurred in small numbers. We believe these

acid-fast organisms are tubercle bacilli, for from the sewer's mouth to a distance of at least 3 miles down stream these acid-fast organisms were capable of producing tuberculosis in guinea pigs, when the sun was not shining. On sunny days the acid-fast organisms when obtained 2.9 miles down stream produced no tuberculosis. Where we could discover no particles of feces in the water we found no viable tubercle bacilli.

The water above the outlet contained no acid-fast organisms on smear.

It should be noted that Jessen and Rabinowitch at Davos found tubercle bacilli only 100 meters below the outlet of the sewer.*

SAMPLE 1. From deep water at mouth of sewer.
25-vi-14, 9.30 a. m., Sunny.

Slides: Positive, numerous acid-fast organisms.

Culture: Contaminated.

Guinea Pigs: A and B.

Autopsy: Sept. 15, 1914, killed.

Inguinal glands very much enlarged, abscess at seat of inoculation. Many tubercles in the liver and spleen, few in the lungs: bronchial glands very much enlarged. Smears from spleen and liver positive to acid-fast organisms.

SAMPLE 2. From surface water at mouth of sewer. 25-vi-14, 9.30 a. m., Sunny.

Slides: Positive for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: A died July 31.

Organs congested; bronchial glands enlarged; smear of suspected parts negative to tubercle bacilli.

Autopsy: B killed Sept. 15, 1914.

Spleen very much enlarged and granular; inguinal glands very much enlarged, liver enlarged, containing many tubercles. Bronchial glands very much enlarged. Smears from the suspected parts showed many acid-fast organisms.

**Zeit fur Tub.*, 1910; XVI, 275.

Distance from sewer mouth.	Location of sample.			Date and time.	Acid-fast organisms	Guinea pigs.	Cultures contam- inated.
	Surface.	Deep.	Mud.				
Mouth	+	..	25-vi-14, 9.30 a.m., Sunny	++	A. Tub. B. Tub.	+
Mouth	+	25-vi-14, 9.30 a.m., Sunny	++	A. Died. B. Tub.	+
Down stream 200 yards.	+	25-vi-14, 10 a. m., Sunny	+	A. Tub. B. Tub.	+
400 yards . . .	+	25-vi-14, 10 a. m., Sunny	+	A. Tub. B. Tub.	+
400 yards	+	..	25-vi-14, 10.30 a. m., Sunny	+	A. Tub. B. Non-Tub.	+
2.9 miles . . .	+	1-viii-14, 10 a. m., Cloudy	+	A. Lost. B. Tub.	+
2.9 miles	+	..	1-viii-14, 10 a. m., Cloudy	0	A. Non-Tub. B. Non-Tub.	+
3.5 miles . . .	+	1-viii-14, 10.30 a. m., Cloudy	+	A. Non-Tub. B. Non-Tub.	+
3.5 miles	+	..	1-viii-14, 10.30 a. m., Cloudy	0	A. Non-Tub. B. Non-Tub.	+
2.9 miles . . .	+	25-ix-14, 9.30 a. m., Cloudy	+	A. Tub. B. Tub.	+
3.5 miles . . .	+	25-ix-14, 10.30 a. m., Cloudy	+	A. Non-Tub. B. Non-Tub.	+
2.9 miles . . .	+	6-vii-15, 9.30 a. m., Sunny	+	A. Non-Tub. B. Non-Tub.	+
2.9 miles	+	6-vii-15, 9.30 a. m., Sunny	+	A. Non-Tub. B. Non-Tub.	+
3.5 miles . . .	+	6-vii-15, 10 a. m., Sunny	+	A. Non-Tub. B. Non-Tub.	+
3.5 miles	+	6-vii-15, 10.30 a. m., Sunny	+	A. Non-Tub. B. Non-Tub.	+
12 miles . . .	+	12-iv-16, 45 min.	0	A. Non-Tub. B. Non-Tub.	Cultures negative
Above outlet	+	13-iv-16, 1 hour	0	A. Non-Tub. B. Non-Tub.	
2.9 miles . . .	+	29-vi-16, 9.30 a. m., Cloudy	+	A. App. Norm. B. App. Norm. C. Tub.	
3.5 miles . . .	+	29-vi-16, 9.30 a. m., Cloudy	0	D. App. Norm. E. App. Norm. F. App. Norm.	..

SAMPLE 3. From surface 200 yards down stream
25-vi-14, 10 a. m., Sunny.

Slides: Positive for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: A killed Sept. 15, 1914.

Right inguinal gland size of a large pea, containing thick pus (slide and tubes made). Spleen enlarged and nodular, full of small tubercles. Slide shows gland positive and spleen negative for acid-fast organisms.

Autopsy: B killed Sept. 15, 1914.

Right inguinal gland size of a large pea, containing thick pus (slide and tubes made). Spleen enlarged and nodular, full of small tubercles. Slide showed gland positive and spleen negative, for acid-fast organisms.

SAMPLE 4. From surface 400 yards down stream.
25-vi-14, 9.50 a. m., Sunny.

Slides: Positive for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: A killed Sept. 15, 1914.

Sup. inguinal glands enlarged; spleen enlarged and nodular; few tubercles. Slide showed gland positive for acid-fast organisms.

Autopsy: B.

Sup. inguinal glands enlarged; spleen enlarged and nodular. Slide showed gland and spleen positive for acid-fast organisms.

SAMPLE 5. From deep water 400 yards down stream. 25-vi-14, 10.30 a. m., Sunny.

Slides: Positive for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: Killed Sept. 15, 1914.

A: Inguinal glands slightly enlarged, spleen slightly enlarged but not nodular, lung apparently normal, liver normal. Smears showed only few acid-fast organisms.

B: Inguinal glands slightly enlarged, lung and liver normal, no acid-fast organisms on the smears.

SAMPLE 6. From surface 2.9 miles down stream.
1-viii-14, 10 a. m., Cloudy.

Slides: Positive for acid-fast organisms; some pus cells.

Cultures: Contaminated.

Guinea Pigs: A and B. A was lost.

Autopsy: B killed Sept. 22, 1914.

Inguinal glands very much enlarged; spleen enlarged and nodular; few tubercles in liver; lungs apparently normal; bronchial glands very much enlarged; spleen, liver and glands showed numerous acid-fast organisms.

SAMPLE 7. From deep water 2.9 miles down stream. 1-viii-14, 10 a. m., Cloudy.

Slides: Negative for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: Killed Sept. 22, 1914.

Apparently normal with the exception of the bronchial glands which were slightly enlarged. Smear preparation showed no acid-fast organisms.

SAMPLE 8. From surface 3.5 miles down stream.
1-viii-14, 10.30 a. m., Cloudy.

Slides: Positive for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: Sept. 22, 1914.

A: Inguinal glands appeared to be slightly enlarged; spleen, liver and lung normal; glands were mashed but no acid-fast organisms found.

B: Apparently normal. No acid-fast organisms found.

SAMPLE 9. From deep water 3.5 miles down stream. 1-viii-14, 10.30 a. m., Cloudy.

Slides: No acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and C.

Autopsy: Sept. 22, 1914.

A: Apparently normal.

C: Apparently normal.

SAMPLE 10. From surface water 2.9 miles down stream. 25-ix-14, 10 a. m., Cloudy.

Slides: Positive for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: Killed Nov. 2, 1914.

A: Superficial inguinal glands slightly enlarged; spleen very much enlarged and nodular; few tubercles in lung and liver; smears positive for acid-fast organisms.

B: Superficial inguinal glands slightly enlarged; spleen slightly enlarged but **not** nodular; lungs apparently normal. Smears showed few acid-fast organisms.

SAMPLE 11. From surface 3.5 miles down stream. 25-ix-14, 10.30 a. m., Cloudy.

Slides: Positive for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: Killed Nov. 2, 1914.

A: Abscess at seat of injection. No tuberculosis.

B: No tuberculosis.

SAMPLE 12. From surface 2.9 miles down stream. 6-vii-15, 9.30 a. m., Sunny.

Slides: Positive for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: Killed Oct. 2, 1915.

A: Apparently normal.

B: Apparently normal.

SAMPLE 13. From mud 2.9 miles down stream.

6-vii-15, 9.30 a. m., Sunny.

Slides: Positive for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: Killed Oct. 2, 1915.

A: Apparently normal.

B: Apparently normal.

SAMPLE 14. From surface 3.5 miles down stream.

6-vii-15, 10 a. m., Sunny.

Slides: Positive for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: Killed Oct. 2, 1915.

A: Apparently normal.

B: Apparently normal.

SAMPLE 15. From mud 3.5 miles down stream.

6-vii-15, 10 a. m., Sunny.

Slides: Positive for acid-fast organisms.

Cultures: Contaminated.

Guinea Pigs: A and B.

Autopsy: Killed Oct. 2, 1915.

A: Apparently normal.

B: Apparently normal.

SAMPLE 16. From surface 12 miles down stream.

Collected 45 min., 12-iv-16.

Slides: Negative for acid-fast organisms.

Cultures: Negative.

Guinea Pigs: A and B.

Autopsy: June 1916.

Lungs, liver, spleen and glands apparently normal. (A and B.)

SAMPLE 17. Above outlet of sewer. Collected 1 hour. Surface. 13-iv-16.

Slides: Negative for acid-fast organisms.

Cultures: Negative.

Guinea Pigs: A and B.

Autopsy: June 7, 1916.

Lungs, liver, spleen and glands apparently normal. (A and B.)

SAMPLE 18. From surface 2.9 miles down stream.

29-vi-16, 9.30 a. m., Cloudy.

Slides: Positive for acid-fast organisms.

Guinea Pigs: A, B and C.

Autopsy: August 14, 1916.

A. Apparently normal.

B. Apparently normal.

C. Superficial inguinal glands enlarged, spleen enlarged and nodular, superficial glands enlarged, bronchial glands slightly enlarged, Acid-fast organisms demonstrated on the smears from the spleen and not from the glands. Lungs and liver apparently normal.

SAMPLE 19. From surface 3.5 miles down stream.

29-vi-16, 9.30 a. m., Cloudy.

Slides: Negative.

Guinea Pigs: D, E and F.

Autopsy: August 14, 1916.

D. Apparently normal.

E. Apparently normal.

F. Apparently normal.

STANDARDS OF MECHANICAL FILTRATION PLANT PERFORMANCE.*

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The standards suggested in this paper are the result of a study of the operation of filtration plants in Maryland upon which the writer was detailed under the general direction of Mr. R. B. Morse, Chief Engineer, Maryland State Department of Health. Acknowledgment is given here both to him and the writer's brother, Dr. Leo Wolman, for helpful criticism of the various statistical problems involved in the discussion.

IN THE past, discussions of the sanitary quality of a potable water have been based upon definitions of absolute standards of quality. For instance, the Imperial Board of Health of Germany issued in 1894 the manifesto that the number of water bacteria which should appear in a filtrate should not be more than 100 per cc. Stein,† on the other hand, would allow as much as 200 per cc. on a 20° C. count for large turbid rivers. Thresh‡ would demand a filtrate uniformly containing less than 100 per cc. Some of the more radical filtration plant operators go so far as to demand no standard as to number, but determine the quality of the water simply by the kind of bacteria.

The objection to all such absolute standards as above seems to lie in the fact that no attempt has been made to justify them by the application of practical tests. With the increasingly large number of mechanical filtration plants in the United States, any hypothetical, arbitrary standard for pure

water is of little practical value, since the problem turns rather upon the question of what the filtration plants can do than of what they should do. An investigation of the analyses of effluent samples of typical plants throughout the country would, therefore, elicit this practical, rather than arbitrary, standard. If this practical standard, in turn, should meet the demands of operators and sanitarians from the point of view of hygienic quality, we shall then be in a position to announce a standard, based upon practical performance, which every filtration plant might be expected to meet.

The measure which we are to seek must perform two functions. It must measure the efficiency of the plant from the point of view of the removal of general bacteria and its magnitude must be such as to warrant the assumption that the effluent from any plant meeting this standard is of undoubted good character. It is quite obvious that the method still in vogue of comparing actual number of bacteria in the raw water with that in the effluent (counts at 20° C.) and using

* Received for Publication, September 18, 1916.

† Water Purification Plants And Their Operation, 1915.

‡ Examination of Waters and Water Supplies, 1913.

the percentage of removal as a test of the efficiency of the process of filtration, leaves much to be desired. With a large number of bacteria in the raw water, a high efficiency is frequently attained while the effluent is entirely unsatisfactory from a hygienic standpoint; whereas with water of a low bacterial content a low efficiency would result no matter what the state of the effluent is. The fallacy in the use of this method of calculation lies in the fact that the efficiency of a plant does not, as is assumed, vary directly with the percentage reduction in the number of bacteria. The plant which reduces a raw water count of 50,000 per cc. to 500 per cc. apparently is as efficient as one reducing 5,000 to 50 per cc., both having a percentage removal of 99. In the first case, however, the effluent is manifestly poor and in the second relatively good. Many examples can be quoted of plants having total bacterial efficiencies of 99 per cent. and yet having effluents varying from 5 to 500 per cc.

As the writer has indicated above, the objection to such methods is due to the fact that real efficiencies do not increase as rapidly as do the actual numbers of bacteria in raw waters. In other words, a more accurate measure of bacterial removal is one in which the increases in absolute numbers are modified by the substitution of data that vary with these numbers but do not increase with the same rapidity. It is a well known fact that the logarithms of numbers fulfill this requirement, since they do not increase as rapidly as do the numbers themselves.

The substitution of logarithms* for the numbers of raw water and effluent bacteria and the calculation of the ratio of these logarithms should for these reasons give a more satisfactory measure than that now in use. To illustrate, using the figures quoted above:

Plant A—Raw Water=5,000; Effluent=50;
Efficiency=99 per cent.

Plant B—Raw Water=50,000; Effluent=500;
Efficiency=99 per cent.

In Plant A the logarithm of 5,000 is equal to 3.7, while that of 50 equals 1.7. Taking the ratio of these two we have a value of 2.2. In Plant B, the logarithm of 50,000 equals 4.7, of 500, 2.7. The ratio of these is 1.7. It is evident from this relation that Plant B is not performing as efficiently as Plant A. The old measure of efficiency of both, 99, shows no such conclusion. It is the writer's purpose, therefore, to illustrate the application of the above method in calculating efficiencies of a number of plants throughout the country, and then to make use of the same in the subsequent discussion. For the sake of clearness, he will hereafter refer to the above ratio of logarithms of raw water and effluent counts as the "co-efficient of efficiency."

In order to obtain sufficient data for a study of filtration plant performance, operating results were obtained from various plants throughout the country. In Tables I and II the results obtained have been classified. Table I gives the bacterial counts

* NOTE: This particular application of logarithms was suggested to the writer by Dr. Leo Wolman, Department of Economics, University of Michigan.

TABLE I.
STATISTICS OF OPERATION OF VARIOUS RAPID SAND FILTRATION PLANTS.

Bacterial count.							
Raw water.				Plant effluent.			
20°.		37°.		20°.		37°.	
Mean.	Max.	Mean.	Max.	Mean.	Max.	Mean.	Max.
		156	1,280			6	500
2,122	32,000			7	22		
2,051	38,000			5	20		
2,968	9,600			41	101		
16,500	100,000+			36	250+		
		400	10,000			0	
		†				†	
8,027	100,000+			24	250		
6,951	148,000			39	430		
		1,332	7,300			3	17
12,460	130,000	1,600	15,900	42	2,080	11	520
350	70,000			6	43		
		77	1,100			2	30
3,451	15,500			24	84		
1,811	40,250	121		3	60	1	
2,868	21,500			19	520		
2,517	22,500			17	435		
		1,714	2,600			7	160
		800	5,000			4	10
		3,894*				18	
1,575	74,200			6	150		
9,284	260,000			30	290		
1,700	6,900			5	30		
		724	2,631			19	89
10,541	75,000			34	900		
47,189	330,000			289	4,800		

* Not under laboratory control.

† No record.

of raw water, filter, and disinfected effluents. Table II contains a tabulation of the coefficients of efficiency under varying conditions of counts. For purposes of discussion the coefficients of efficiency, based on mean counts at 20° C., will be used, since

most of the plants have apparently used these counts. As is noted on the heading of Table II, these coefficients have been calculated upon the basis of raw water and final effluent, whether disinfected or not, so as to represent a measure of efficiency of the entire

TABLE II.

STATISTICS OF OPERATION OF VARIOUS RAPID SAND FILTRATION PLANTS.

Coefficient of efficiency—raw to final effluent.

Mean count—20°.	Mean count—37°.
	2.81
3.92	
4.73	
2.17	
2.71	
†	*
2.83	†
2.42	
	6.94
2.53	3.08
3.26	
	6.29
2.56	
6.80	*
2.70	
2.77	
	3.81
	4.84
	2.87
4.10	
2.68	
4.64	
	2.23
2.61	
1.90	

* Infinity—Effluent = 1 or 0, hence $\log. = 0$; therefore coefficient = infinity.

† No record.

plant. The application of the coefficient can, of course, be extended to the measurement of individual phases of operation within the plant itself, as the writer will later illustrate.

After making an examination of the data tabulated in the above tables, it becomes clear what standard of efficiency may be reasonably demanded

of mechanical filtration plants. This standard is suggested in the following:

No mechanical filtration plant should be considered as operating efficiently, unless a coefficient of efficiency of at least 2.5 (based on mean counts of raw water and final effluent at 20° C.) is consistently obtained. This, of course, is modified by the following:

As a corollary to this it should be stated that a plant obtaining on an average less than 2.5, is either working inefficiently or else the bacterial content of the raw water is comparatively low.

Let us now test these requirements by an example: If a raw water contains 100,000 bacteria per cc., the effluent must contain no more than 100 per cc., in order to maintain a coefficient of efficiency of 2.5. If the raw water should contain 1,000 per cc. and the effluent 16, or the raw water 500 and the effluent 12, the coefficient would still be 2.5. However, if the bacterial counts were 100 and 10, for the raw and filtered water respectively, the coefficient of efficiency would be only 2.0. But in this case the bacterial count in the untreated water is low and, considered from this one point of view alone filtration is not needed.

That the filtration plants of this country should meet this requirement, except under extraordinary conditions, is indicated by the fact that almost all of those of which the writer has record can and do meet it. Within the limit of raw water count suggested above, a coefficient of 2.5 does not seem to be too high. So far as the

writer is aware, no mechanical filtration plant for a public water supply has to deal with water averaging anywhere near 100,000 bacteria per cc.

It should also be noted that any coefficient below 1.0 would indicate that the plant is producing an effluent worse in bacterial content than the raw water.

One advantage of the coefficient of efficiency evidently lies in the fact that it is not as much influenced by great numerical increases in bacteria as is the percentage removal measure, based on actual counts. A far more important advantage, too, is that the influence of great increases in counts in effluent samples is greater than those in raw water samples since the logarithms of small numbers increase more rapidly than those of large. This should be so, since, in the past, no mathematical cognizance of sufficient weight has been taken of the filter effluent count—which after all is of prime importance in estimating the operating efficiency of the works. This comparison of coefficients of efficiency and actual percentage removal is well illustrated in the following table of results of a plant in Maryland (Table III).

The month of December, 1915, for instance, shows a percentage efficiency greater than that of November. The average effluent count is, however, higher. The coefficient of efficiency, on the other hand, gives a more accurate picture of the work of the plant from the point of view of the sanitarian, since November shows a higher coefficient than December. It is interesting to note, also, that practically

TABLE III.

COMPARISON OF COEFFICIENTS OF EFFICIENCY WITH PERCENTAGE REMOVAL OF BACTERIA ON THE BASIS OF AVERAGE COUNTS AT 20° C.

	Coefficient of efficiency.	Percentage removal efficiency.
1915.		
October		
Raw—10,842		
Eff. — 48	2.39	99.557
November		
Raw—1,009		
Eff. — 4	5.00	99.604
December		
Raw—19,771		
Eff. — 52	2.50	99.737
1916.		
January		
Raw—33,150		
Eff. — 198	1.97	99.403
February		
Raw—64,100		
Eff. — 136	2.26	99.788
March		
Raw—80,368		
Eff. — 592	1.77	99.263
April		
Raw—55,056		
Eff. — 196	2.07	99.644
May		
Raw—3,270		
Eff. — 325	1.40	90.061

October 1—December 31, 1915
and

January 1—May 31, 1916.

1915.		
Raw—10,541		
Eff. — 34	2.61	99.677
1916.		
Raw—47,189		
Eff. — 289	1.90	99.388

each month this plant showed a removal of over 99 per cent., even though the effluents varied in count from 4 to 592 per cc. It is plainly obvious from the above table that the coefficient of efficiency follows more sensitively than the percentage removal the true performance of the works.

Together with a standard for bacterial counts, there must be also at hand some standard to determine the allowable frequency of bacilli coli in the plant effluent. In determining this standard, the same method as used above was followed, that is, an empirical rather than arbitrary standard was sought. Presumptive, rather than isolation, tests were used, because most of the plants, for which records are available, do not attempt to isolate and because, for purposes of comparison only, it is unimportant whether the isolations are a low or high percentage of presumptives. This is particularly true, since similar conditions are being compared and any error which would occur would affect the results of each plant in the same way. Practically all of the plants used hypochlorite or liquid chlorine. The academic question as to whether *B. coli* are actually isolated in any one plant is important for any absolute guarantee of the purity of the effluent, but in a measure of the operation of a plant a comparative standard is for practical purposes sufficient. Such a standard based upon presumptive tests only is, therefore, warranted. An examination of Table IV indicates that the range of coli in 1 cc., in raw waters at various plants, varies from 60 per cent. to 100 per cent. of all

samples. A further study of this same table discloses the fact that a majority of the plants listed can obtain an effluent showing colon present by presumptive test in 10 cc. in less than 10 per cent. and in 1 cc. in not more than 2 per cent. of the samples. A number of the plants obtain much better results than these. The above data show fairly well that there is a degree of uniformity in the presence of colon in the raw water of all plants. As a measure of the efficiency of the plant, from the point of view of colon removal, the following standard is suggested:

That the percentage of samples showing colon present in the effluent of a mechanical filtration plant by presumptive tests shall not exceed 10 per cent. in 10 cc., nor 2 per cent. in 1 cc.

In interpreting daily *B. coli* results at any plant, it has been found, too, that no satisfactory measure exists to determine the relative efficiencies of colon removal of various stages of operation. If a raw water containing *B. coli* in 0.01 cc. passed through the coagulating basin and entered the filter beds with colon present in 0.1 cc. and finally left the filters with colon in only 1 cc., we had no measure of the changes taking place, so as to compare individual stages of operation on successive days. The method of Phelps, of using the reciprocal of the greatest dilution giving a positive test as the actual number of *B. coli* present, is of value in determining the absolute quality of effluents at various stages, but for comparisons within the plant it has objections which the writer will attempt to make clear. Using the

TABLE IV.
STATISTICS OF OPERATION OF VARIOUS RAPID SAND FILTRATION PLANTS.

Colon bacillus--per cent. of tests positive.											
Raw water.								Plant effluent.			
Presumptive.				Isolation.				Presumptive.		Isolation.	
10.	1.	0.1.	0.01.	10.	1.	0.1.	0.01.	10.	1.	10.	1.
106	100							0	0		
	64*								0.54*		
	87.5								1.88		
	90	46.4	10.6						1.08		
91	77							0	0		
								7.4	0		
	88.8	63.9	6.0					22.7	6.27		
100	91							17.0	0		
		87.0						26.3	3.20		
	90.2	45.3			81.0	37.0		7.7	0.50	6.0	0.20
86.8								0.27			
	48.9								1.22		
	30.8								0.64		
	23.8								0.21		
	92.0							4.0			
99	85.0							†		†	
	‡99.1	78.0						30.5	6.40		
	36.3							0			
100	87.6							3.09	0		
					86.0					3.4	0
	§98.0									16.4	4.3
100	91.0	46.0	16.6	69.0	54.0	30.3	7.1	50.0	2.0	4.0	2.0
100	72.0	32.0	12.6	76.2	50.4	22.2	7.2	68.6	10.6	15.2	5.8

* Average for 7½ years. † Less than 1.00. ‡ Not under laboratory control. § In 0.5 cc. || No record.

example quoted above, we have the following, by Phelps' method: Raw water=100 B. coli per cc., coag. basin effluent=10 per cc., filter effluent=1 per cc. By the percentage method the removals are as follows: Coag. basin=90 per cent., filter effluent=90 per cent.; Tot. plant=99 per cent. If on the second day the raw water

conditions were the same and the filter effluent showed B. coli in 10 cc., the efficiency of the entire plant would be 99.9 per cent. The percentage method, in other words, places too great emphasis upon low degrees of colon removal. The measure which the writer will venture to suggest, has for its object the comparison of the

CHART I.

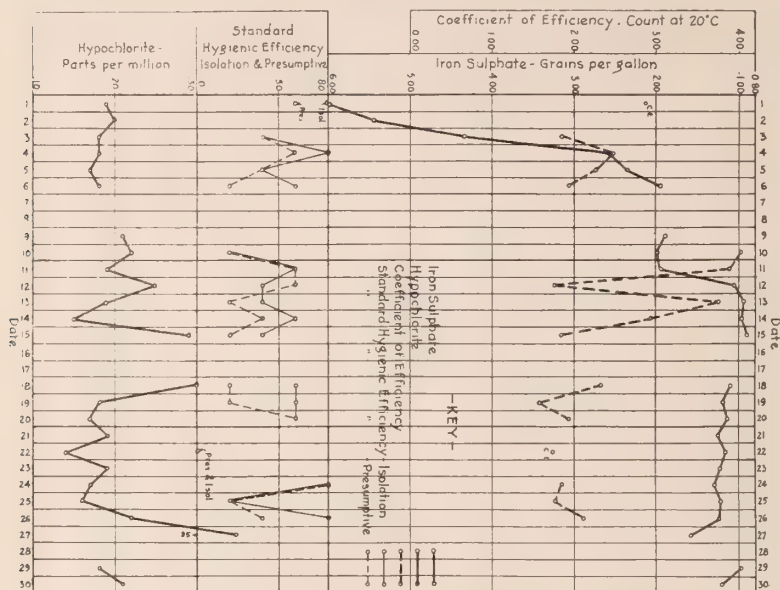
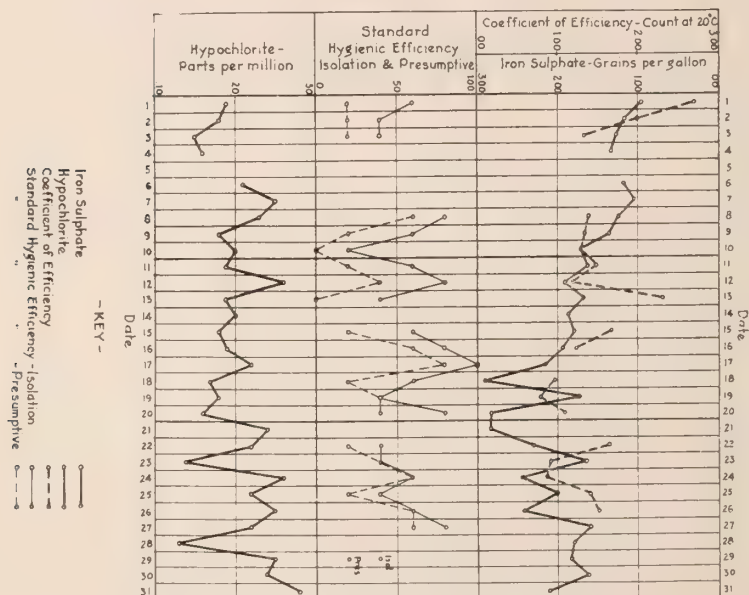


CHART II.



successive steps of colon removal, rather than of actual quantities of *B. coli*. For this purpose a "Standard Hygienic Efficiency" has been arbitrarily assumed as 100 per cent. when there are removed from a raw water showing positive presumptive or isolation tests for colon in 0.01 cc. sufficient bacilli to produce an effluent showing negative presumptive or isolation tests, as the case may be, in 100 cc. The following table has been devised for uses as above outlined:

Colon present in			$\left. \begin{array}{l} 100\% \text{ Standard} \\ \text{Hygienic Efficiency, when raw} \\ \text{water is posi-} \\ \text{tive in 0.01 and} \\ \text{effluent is nega-} \\ \text{tive in 100 cc.} \\ \text{Each interme-} \\ \text{diate step} = 20\% \\ \text{S. H. E.} \end{array} \right\}$
Raw water +	0.01	20%	
+	0.1	20%	
+	1.0	20%	
+	10	20%	
+	100	20%	
Plant Eff. -	100	20%	

By the percentage method, using Phelps' system, this table would be

Raw water +	0.01	90%	$\left. \begin{array}{l} 90\% \\ 90\% \\ 90\% \\ 90\% \\ 90\% \end{array} \right\} = 100\% \text{ (minus)}$
+	0.1	90%	
+	1.0	90%	
+	10	90%	
+	100	90%	
Plant Eff. -	100	90%	

That is, less than 10 per cent. absolute difference exists between any one step in this process and the entire process. Inasmuch as it is not yet established just what relative difficulty of filtration is encountered in

each step, it is only fair to assume an equal efficiency for each successive step of colon removal.

Example:

- (1) Raw water = *B. coli* in 0.1 cc.
Plant Effluent = *B. coli* in 100 cc.
Standard Hygienic Efficiency = 60%
Efficiency by Phelps method = 99.9%
- (2) Raw water = *B. coli* in 0.01 cc.
Plant Effluent = *B. coli* in 100 cc.
Standard Hygienic Efficiency = 80%
Efficiency by Phelps Method = 99.99%

The writer wishes to reiterate here that the Standard Hygienic Efficiency is of use only in the interpretation of data within the plant or in comparison with other plants and not as a measure of the sanitary quality of the effluent. For the latter purpose, the judicious use of the coefficient of efficiency combined with Phelps' method of estimating *B. coli* gives all that is desired within practical limits.

The application of the S. H. E. to the solution of practical problems in filtration is illustrated in Charts I and II. Here comparisons are made, for successive days, between S. H. E. coefficients of efficiency, and various doses of a plant in Maryland. The advantage of the measures used over the former percentage methods is clear when it is realized that, by the old system, almost all the total removals would be in the neighborhood of 99 per cent., and most of the colon removals indistinguishable from one another.



Private opinion is weak, but public opinion is almost omnipotent. A single snowflake—who cares for that? But a whole day of snowflakes, drifting over everything, obliterating landmarks, and gathering on the mountains to crash in avalanches—who does not care for that?

—H. W. BEECHER.—*Ex.*

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THE CINCINNATI MEETINGS.

The forty-fourth annual meeting of the American Public Health Association was held in Cincinnati, Ohio, from October 24 to 27. The attendance was large, in fact being second only to the record meeting in Rochester the previous year.

Those who were present at Symphony Concert on Tuesday night will long remember that splendid and dignified occasion. President John F. Anderson's address was delivered at this time and makes a worthy addition to the long list of presidential addresses. Doctor Anderson, whose address is published in this issue, devotes some space to the affairs of the Association. Notable is his suggestion that the number of sections in the Association should be added to in order to make room for the ever increasing numbers of specialists in the domains of sanitary science. In connection with this, petitions were presented asking for the formation of sections dealing with food and drug control and with educational hygiene. These petitions were referred to the Executive Committee by the Board of Directors with the recommendation that they be granted and the new sections created.

Doctor Anderson particularly emphasizes the problems of industrial hygiene. Problems created by the tremendous development of industry, of appalling magnitude and hardly yet touched by the sanitary profession. Incidentally the Section on Industrial Hygiene held very interesting sessions. Their program was characterized by a prominent expert in this field as being the best program on the subject yet presented in this country.

Space prohibits references to many of the important matters considered at both General Sessions and section meetings, but readers of the JOURNAL are assured of much interesting and valuable matter in subsequent issues of the

JOURNAL. Suffice it to say that there was great evidence of the spirit and earnestness of the health workers present, a solidarity which means much for the noble work of life preservation.

The Association was happy to welcome two of its Mexican members, Dr. Jesus Monjaras and Dr. Manuel Iglesias who came at great difficulty and personal sacrifice. The local committee, headed by Dr. John H. Landis, received and deserved the thanks of all present for the splendid arrangements that made it possible for the meetings to be so successful in every manner.

RESOLUTIONS ADOPTED BY THE AMERICAN PUBLIC HEALTH ASSOCIATION.

Resolved, that the American Public Health Association endorses the principle that manufacturers of all patent medicines be required to file the formulæ of all such preparations with the Bureau of Chemistry, Department of Agriculture, and with other proper state and municipal authorities in the United States and with the proper authorities in Canada, Mexico and Cuba.

WHEREAS, United States Senate Bill 4086, providing for the establishment of a national leprosarium and the more humane care of lepers than is possible under state and municipal administration, on account of the exceptional nature of the disease, and,

WHEREAS, said bill has been favorably reported by the Senate Committee on Public Health and National Quarantine,

Be it resolved, by the American Public Health Association in Annual Meeting assembled, that we most heartily and unanimously approve of the principle of this bill and respectfully recommend its early enactment into law as a measure called for by the highest considerations of public policy and the welfare and needs of those concerned.

Be it resolved, that the Chair appoint a Permanent Committee of five on Professional Education for Public Health Work, the term of one member shall expire each year, and his successor shall be appointed for a term of five years. The duties of the committee shall include a standardization of the courses in this field, both in medical schools and those schools training professional public health workers. It should be the aim of this committee to coöperate with the Council on Medical Education of the American Medical Association and the Association of American Medical Colleges in order to secure universal adoption of such standardized courses and an increase of the amount of attention paid the subject. The committee should also work towards a uniformity in the degrees or other awards conferred upon candidates at the successful completion of professional courses for public health workers.

TUBERCULOSIS AMONG PROSTITUTES: REPORT OF AN INVESTIGATION MADE IN CONNECTION WITH A STUDY OF THE DISEASE IN CINCINNATI, OHIO.

D. E. ROBINSON and J. G. WILSON,
U. S. Public Health Service.

IN CONNECTION with an investigation of tuberculosis made in Cincinnati, Ohio, by the writers for the purpose of determining the predisposing causes of the high death-rate from tuberculosis in that city,* a survey of the disease among prostitutes was also made. This survey was undertaken, not so much with the idea of ascertaining the danger to those living this life in regard to tuberculosis, but with a view of determining how great a public menace tuberculosis among prostitutes presents. There can be no question that a prostitute who is an open case of tuberculosis may be the means of transmitting the infection to many others. When it is remembered that one prostitute will often have as many as 25 or even more patrons in one night, the danger from this source is admittedly great.

It may be argued that those who frequent these places do so at their own peril and deserve no better fate than to contract a disease which will later cause death or a life of misery, but this does not alter the fact that the prostitute may be the original source of an infection which may later be transmitted to many other persons.

The study by Irwin of tuberculosis among prostitutes in Philadelphia and Atlantic City† showed an enormous amount of the disease among this class of women, as he found 82 tuberculous out of a total of 218 examined.

Our survey in Cincinnati has not shown anything near such a high percentage of tuberculosis. There are good reasons for this discrepancy in results, among which those of greatest significance are, first, that the women examined by Irwin included street-walkers, as well as the women in houses, and second, and most important, that a very strict surveillance is maintained over this class of women in Cincinnati. Each one is required to have in her possession a medical certificate from a reputable physician stating that she is not suffering with any form of venereal disease and this certificate must be renewed each week. Any woman found by the police without such certificate is arrested and taken to the City Hospital for examination and detention, in the event venereal disease is found. This weekly medical examination naturally tends to preserve a better state of the general health than would otherwise obtain, as the examining physician would,

* Report of this investigation is published as Public Health Bulletin No. 73 by the U. S. Public Health Service. The investigation was made at the joint request of the Board of Health and Anti-tuberculosis League of Cincinnati, extending from March, 1914, to April, 1915.

† J. W. Irwin. Study of the Relation of Prostitution to Tuberculosis. Proceedings of the Sixth International Congress, Volume III, pp. 332-338.

if ordinarily competent, note any evidences of incipient tuberculosis, and would advise the girl of the danger to her life.

The survey was conducted with the coöperation of the Police Department and every woman was compelled to submit to the examination, which could be carefully made, as the conditions for doing so were favorable.

The results of the survey, while not showing a great number of dangerous cases, only 3 being found who were considered a menace to the public, confirmed the suspicion that a considerable degree of tuberculous infection among the dissipating element of a city's population may be acquired from this source, but equally important, when contrasted with the results reported by Irwin, stands forth the value, from a health standpoint, of regulated prostitution, if this evil must exist.

The following tables show in detail the results of the physical examination of the inmates of 68 houses:

	White.	Colored.	Total.
Number examined	275	40	315
Number of open cases of tuberculosis	1	2	3
Number of cases of incipient tuberculosis .	18	1	19
Number of cases of arrested tuberculosis .	5	0	5
Number showing evidences of tuberculosis	24	3	27
Percentage showing evidences of tuberculosis	8.57		

The 3 cases of open tuberculosis were immediately removed to the hospital by the police and later sent to the tuberculosis hospital. The

Health Department will also require the incipient cases to report monthly to the Anti-Tuberculosis League for examination and any action which may be necessary.

These women were all of American birth with the exception of 10, of whom 1 was born in Ireland, 1 in Canada, 3 in Russia, 2 in Austria, 2 in Germany, and 1 in Sweden.

Analysis of the foregoing table shows that of the 27 cases 24 were white and 3 black; all were United States born except 3. Fourteen were single, 11 separated, and 2 married. All but 3 had been employed at some kind of occupation before becoming prostitutes. Domestic service had been the most frequent previous employment, 9 having been house servants in some capacity. The average length of time engaged in prostitution was 6.89 years with extremes of 3 months and 15 years. Of the 27 cases showing physical signs of tuberculous infection there were only 3 cases believed to be a public menace. Five were arrested cases and 19 showed physical signs indicating the disease was either incipient or not actively progressing at the time of examination.

The percentage of tuberculosis (8.57) was much higher among prostitutes than in other occupations. A careful analysis of the individual cases and the general surroundings of these 27 tuberculous prostitutes leaves no doubt of the hazard of the life. All but one had contracted the disease since entering it. However, there are certain factors which serve to show that tuberculosis is not necessarily fatal even when aggravated by such unfavorable

TABLE 3.
TABULATION OF TUBERCULOUS CASES.

No.	Age.	Age when became a prostitute.	No. years a prostitute.	Previous occupation.	Social condition.	Nativity.	Color.	Stage of disease.
1.....	30	15	15	None	Single	U. S.	White	Incipient
2.....	25	21	4	Waitress	Single	U. S.	White	Arrested
3.....	28	24	4	Laundress	Single	U. S.	White	Incipient
4.....	22	18	4	Office clerk	Single	U. S.	White	Incipient
5.....	27	22	5	Domestic	Single	U. S.	White	Incipient
6.....	26	17	9	Cigar factory	Separated	U. S.	White	Incipient
7.....	26	20	6	Cigar factory	Separated	U. S.	White	Incipient
8.....	28	17	11	Candy factory	Separated	U. S.	White	Incipient
9.....	33	22	11	Domestic	Single	Austria	White	Incipient
10.....	28	21	7	None	Single	Russia	White	Incipient
11.....	26	21	5	Housewife	Separated	U. S.	White	Incipient
12.....	23	17	6	Waitress	Married	U. S.	White	Incipient
13.....	25	24	1	Domestic	Single	U. S.	White	Incipient
14.....	36	21	15	None	Single	Russia	White	Arrested
15.....	27	18	9	Shoe factory	Separated	U. S.	White	Incipient
16.....	26	21	5	Saleslady	Separated	U. S.	White	Incipient
17.....	21	16	5	Cigar factory	Single	U. S.	White	Arrested
18.....	24	19	5	Domestic	Single	U. S.	White	Incipient
19.....	49	35	14	Domestic	Separated	U. S.	White	Arrested
20.....	24	17	7	Shirt factory	Separated	Sweden	White	Incipient
21.....	26	22	4	Cigar factory	Married	U. S.	White	Incipient
22.....	30	20	10	Housework	Single	U. S.	White	Arrested
23.....	23	20	3	Housewife	Separated	U. S.	White	Active (open)
24.....	35	29	6	Domestic	Separated	U. S.	White	Incipient
25.....	22	22	$\frac{1}{4}$	Domestic	Single	U. S.	Black	Incipient
26.....	27	21	6	Domestic	Separated	U. S.	Black	Active (open)
27.....	25	22	3	Domestic	Single	U. S.	Black	Active (open)

influences. The following abstracts of histories of the arrested cases are illustrations in point:

No. 2 had been a prostitute 4 years, and although only 25 years of age, her disease appeared to be entirely arrested.

No. 17, 21 years of age, had been a prostitute 5 years, mother having died of tuberculosis. She gave a history of having lost weight and being in a run-down condition after entering the career, but while still continuing she had re-

gained her health, and incidentally taken on 12 pounds. Here was evidently an arrested case, which had reached its favorable state while she was still actively engaged as a prostitute.

No. 22, 30 years of age, had contracted pneumonia subsequent to becoming a prostitute. This had left her with a chronic cough which had disappeared entirely at the time of examination. There were weak breath sounds and dullness over the right lung but no signs of active disease.

No. 19, 49 years of age, mother died of tuber-

culosis. This woman had been a prostitute for 10 years. Eight years previous to her entrance upon this life she had suffered a severe hemorrhage from the lungs. Five years after she became a prostitute she had another hemorrhage. She had had a chronic cough a great deal of this time but has been gaining weight steadily for the last four years.

No. 14, 36 years of age, a prostitute for 15 years, 9 years ago lost weight and ran down in health. Examination shows evidences of arrested pulmonary tuberculosis. She is now robust in appearance and feels entirely well.

In the whole series of 27, there were only 2 giving a family history of tuberculosis. These were both arrested cases, as noted in the foregoing abstract of histories.

There were two factors which, in a measure, tended to counteract the extreme hazard of occupation among the prostitutes who were examined. These were:

1. Age distribution

(Reference to table "A" will show that 92 per cent. of all those examined were within those age periods when tuberculosis is most likely to be contracted)—and

2. Hygienic surroundings.

(The most of these cases were recruited from very humble stations in life where

their previous hygienic surroundings had probably been worse than those prevailing in their present dwelling places. Good and plentiful food was the universal rule in all the houses in which these prostitutes lived, and the stringent police regulations kept alcoholic dissipation within reasonable bounds.)

Finally, it should be remembered that a careless and indifferent attitude toward all life's problems is a general characteristic of prostitutes. This inherent intellectual inferiority renders them, as a class, incapable of taking proper care of themselves and this factor should be considered when estimating the hazard incident to their life.

AGES.

None of the prostitutes was found below 20 years of age, while 139 or 44 per cent. were under 25, 222 or 70.4 per cent. under 30 and 22 or 7 per cent. were over 40.

For those presenting evidences of tuberculosis 23 or 85.3 per cent. were under 30, as compared with 70.4 per cent. under this age of the total number examined.

A.

Ages of Prostitutes Examined.

20 to 25 years.	25 to 30 years.	30 to 40 years.	40 to 50 years.	Over 50 years.	Not ascer- tained.	Total.
139	83	69	20	2	2	315
44.1%	26.3%	22%	6.4%	0.6%	0.6%	100%

B.

Ages of Prostitutes Found Tuberculous.

20 to 25 years.	25 to 30 years.	30 to 40 years.	40 to 50 years.	Over 50 years.	Total.
10	13	3	1	0	27
37%	48.3%	11.2%	3.5%	0%	100%

The previous table shows the number of prostitutes for the different age periods, both among the prostitutes as a whole and among the tuberculous alone.

AGE AT TIME PROSTITUTION BEGAN.

As to the age at which these women entered upon the life of prostitution, 238 or 75 per cent. began below the age of 23 and 36 or 11.5 per cent. at or below the age of 16. In 8 instances the life had begun at the early age of 15, in 5 at 14 and in 1 case the prostitution had commenced when only a child of 13.

For the 14 cases beginning this life under the age of 16, nearly all had been in the "tenderloin" many years, the highest 29 and the lowest 5, with an average of $14\frac{1}{2}$ years. Among these women but one case of tuberculosis was discovered, and only 3 were found in anything approaching a poor physical condition, the others being in very good health and of robust appearance. Of the 21 who commenced the life at the age of 16, 1 presented evidences of arrested tuberculosis, while in 5 others the physical condition was marked as only fair. The average length of time at the business for these 21 was 9.7 years, with extremes of 40 and 5.

Among those entering upon the life of a prostitute below the age of 16, the father and mother were both dead in 6 instances, the father alone dead in 6, the mother alone in 1, and 1 girl had no knowledge of her parents. These figures would indicate that the death of one or both parents had much to do with the daughter taking up this

life. This is further evidenced by the fact that of those who entered the segregated district at the age of 15, 3 had previously been compelled to go out to work, 1 as a servant, 1 in a tailor shop and 1 in a tobacco factory.

Twenty-two had become prostitutes at or after the age of 30, among these being 2 at 39, 3 at 40 and 1 at 45. Here again the breaking up of the home was apparently the one important cause, as 7 of this class were widows, 6 were divorced and 5 married but separated. From the above figures, therefore, the one conclusion to be drawn is that those who enter upon a life of prostitution either at a very early or advanced age usually do so because death, divorce or separation has broken up the home, throwing the young girl or the woman in advanced years, as the case may be, suddenly and without preparation of any sort, upon her own resources, with the consequence that many tend to follow the line of least resistance and take up what seems to them the easiest way of earning a livelihood.

NUMBER OF YEARS IN LIFE.

As to the length of time these women had been following the career of a prostitute, our figures confirm the commonly stated fact that the average time as a prostitute is from 7 to 8 years. Of the 315 examined, the average length of service was exactly 7 years, although 108, or 34 per cent., had been in the life for a longer period. The length of time for the prostitutes as a whole varied between a few months and 40 years, the great majority being between 2 and 9 years.

Below is given a table showing the length of service for all.

Length of Time in Prostitution.	Number.
Under one year.....	8
One year.....	8
Two years.....	20
Three years.....	47
Four years.....	32
Five years.....	43
Six years.....	25
Seven years.....	24
Eight years.....	21
Nine years.....	13
Ten years.....	18
Eleven years.....	11
Twelve years.....	11
Thirteen years.....	2
Fourteen years.....	3
Fifteen years.....	6
Sixteen years.....	2
Seventeen years.....	3
Eighteen years.....	4
Nineteen years.....	2
Twenty years.....	5
Twenty-one years.....	1
Twenty-four years.....	2
Twenty-five years.....	1
Twenty-nine years.....	1
Thirty-three years.....	1
Forty years.....	1

The girls were also classified as to general physical appearance with the following results:

Robust.....	147
Good.....	80
Fair.....	38
Frail.....	22
Dissipated.....	2

These figures do not include those found tuberculous. This shows that 147 or 46.6 per cent. were in very good physical condition. This can be ascribed in great measure to the fact that no alcoholic drinks of any description were permitted to be sold in these houses.

PREVIOUS OCCUPATION.

An analysis of the work previously engaged in by the women shows that nearly all were drawn from the working classes, only 27 reporting as not having done any kind of work before becoming prostitutes, and this probably because of the early age at which prostitution was commenced. Eighty-two, or 26 per cent., had been employed in domestic service as house servants, and 72 gave as their only previous occupation that of housewife, this class being from among the ranks of the divorced and widowed.

Among factory workers a greater percentage had been previously employed in cigar factories than in any other line of industry, 17 having come from this industry. Among Irwin's cases, 18 were also from tobacco workers. Whether working in tobacco is to blame for this cannot be positively stated, although the opinion is frequently expressed that the sexual desire in female workers in tobacco is above the normal. "Lack of fecundity and frequent miscarriages are also said to be common among women employed in tobacco factories, as well as retardation in sexual development of young girls."*

Upon questioning one of the prostitutes, who had formerly been employed in a large tobacco factory, as to the reason so many of these workers become prostitutes, she stated that in her own case, and she thought also in many others, it was due to the unrestricted mingling of the sexes permitted in these factories, and not to any

* Reference Handbook Medical Science.

particular influence of the fumes of tobacco.

Eighteen gave their previous occupation as laundresses, but not all worked in laundries.

The second highest number drawn from factory workers was found among shoe workers, 12 having come from shoe factories.

Below is shown in detail the previous occupation of all those examined with number in each.

Previous Occupation.	Number.
Artist's model.....	1
Cooks.....	2
Candy factories.....	4
Can factory.....	1
Chambermaids.....	5
Cherry pitter.....	1
Cotton mill.....	1
Clothing factory.....	2
Envelope factory.....	1
Electrical factory.....	1
Factory work.....	3
Forewoman.....	1
House servants.....	82
Housewives.....	71
Laundresses.....	18
Manicurist.....	1
Milliner.....	1
Nurses.....	2
No occupation.....	27
Office work.....	7
Packers.....	3
Paper box factory.....	2
Performer.....	1
Saleswomen.....	9
Seamstresses.....	9
Shoeworkers.....	12
Shirt factories.....	2
Telephone girls.....	2
Tobacco workers.....	17
Waitresses.....	26

One thing which impressed us most forcibly was the fact that the great majority of these women appeared to

be of very low mentality, especially was this true of those drawn from the ranks of house servants.

PARENTS OF PROSTITUTES.

Of the entire number of prostitutes examined, both parents were dead in 114 instances, the father alone dead in 80 and the mother alone dead in 53, while in but 63 were both parents still living, and in 5 instances the girl had no knowledge of her parents. While these figures would tend to prove that as long as the parents were alive the girl will not be so apt to become a prostitute, still unfortunately, as we were informed by the police, too often the girl enters these places with the full knowledge and consent of her parents and still more strange to relate, is frequently urged to do so by her parents.

As tending to show that the girl or woman takes up this form of life because of the stress of circumstances which may or may not be of her own making, the analysis of the social conditions of the entire number of prostitutes examined shows that 149 were single, 98 divorced, 30 widows and 40 stated that they were married. The latter class was composed chiefly of those who were following this life with the consent of the husband, who shared in the profits, but also included a few who were not on friendly terms with the husband. A large percentage (33.7) of the divorced class had one or more children living, and comparing the age of the youngest child with the length of time as prostitutes indicates that the difficulty of supporting the

child may have influenced the woman in becoming a prostitute. The following table presents interesting data in this relation:

3. To the fact that prostitution in Cincinnati is regulated as regards

Divorced.				Widowed.			Married.			Single.		
No.	No. of children.	Age of youngest.	Length of time prostitute.	No. of children.	Age of youngest.	Length of time prostitute.	No. of children.	Age of youngest.	Length of time prostitute.	No. of children.	Age of youngest.	Length of time prostitute.
1.....	1	7	5	1	6	3	1	9	9	1	1½	1½
2.....	1	5	3	1	10	2	1	13	2	1	11	6
3.....	1	15	11	4	2	12	1	13	12½	1	12	8
4.....	1	7	4	1	2	1	1	20	5	1	21	16
5.....	1	6	5	4	4	2	1	25	6	1	9	4
6.....	2	9	6	1	11	3	2	21	1	2	6	6
7.....	3	21	12	8	8	10	1	15	7			
8.....	4	16	1	1	19	4	2	12	18			
9.....	1	8	3	1	6	5	1	6	4			
10.....	1	12	11	1	8	9	1	10	8			
11.....	1	10	5				1	7	5			
12.....	1	16	9									
13.....	3	19	12									
14.....	1	5	5									
15.....	1	10	8									
16.....	2	35	25									
17.....	1	2	1⅓									
18.....	1	1⅓	1									
19.....	1	39	40									
20.....	4	16	10									
21.....	2	13	1¼									
22.....	2	19	11									
23.....	2	16	4									
24.....	2	10	2									
25.....	2	7	11									
26.....	1	6	6									
27.....	4	21	14									
28.....	3	7	5									
29.....	2	6	3									
30.....	1	7	5									
31.....	1	7	6									
32.....	2	3	2									
33.....	1	3	2									

Besides these living children, 18 among the divorced, 3 among those who were married, and 6 of the unmarried had given birth respectively to 24, 5 and 7 children who had not lived.

CONCLUSIONS.

1. Prostitutes are especially liable to the development of tuberculosis because of lowered resistance and the greater chances of infection.

2. Tuberculous prostitutes are a

segregation, weekly examinations, and non sale of liquors in the houses is due the comparatively low rate of incidence of tuberculosis found among these women.

4. A large proportion of those who

enter the life at an early age do so, because of the loss of one or both parents, and among those beginning the life at a more advanced age the breaking up of the home through death, divorce, or separation is an important cause.

5. A large percentage of prostitutes

is drawn from the class of house servants, and mental deficiency is quite noticeable among these women.

6. If prostitution must exist, the examination of the prostitutes at frequent intervals for evidences of tuberculosis, as well as venereal disease, is to be recommended.



AN INSURANCE MAN ON SOCIAL INSURANCE.

At the National Convention of Insurance Commissioners held recently in Richmond, Va., Hon. Rufus M. Potts, superintendent of the Illinois State Insurance Department, and chairman of the Committee on Social Insurance appointed by the convention, discussed social insurance from the standpoint of the insurance expert. Fearing that the designation "social insurance" might produce a hostile attitude on the part of the general public on account of an erroneous association with the Socialist party, Mr. Potts proposes to designate all such plans as "welfare insurance," which he defines as "the use of insurance principles and methods for the purpose of . . . maintaining every citizen of the United States in a state of wellbeing throughout the various misfortunes and emergencies of life that would otherwise destroy his wellbeing and cause destitution and suffering." He called attention to the fact that there is in every country an unnecessary amount of poverty or suffering which is not due to the improvidence or even misconduct of the individual himself, but which is brought about by accident, sickness, premature death of the bread-winner, involuntary unemployment, old age or other causes beyond the control of the individual. He estimates that there are annually in the United States about 82,520 deaths from industrial accidents and 208,000 non-fatal industrial accidents, each sufficiently severe to cause more than seven days' loss of time, and that the total number of non-fatal accidents, industrial and non-industrial, is about 697,000. The number

of cases of sickness among working people he estimates at 13,400,000, entailing a total loss of time of 284,750,000 days, or a wage loss of \$488,142,852. The number of deaths each year among wage-earners between the ages of 15 and 65 he estimates at 608,239, causing approximately 200,000 dependent families left unprovided for annually. Regarding unemployment, there are practically no reliable statistics. Existing society, accident, sickness and life insurance are wholly inadequate, and reach only a small portion of the total population. Universal welfare insurance under the control of the federal government would, in Mr. Potts' opinion, reduce the expense of operation to a negligible minimum, render it feasible for the nation to contribute to welfare insurance, and compel the improvident to make provision for their families and themselves when overtaken by misfortune. The insurance of all the workers would include such enormous numbers that under the law of average the conduct of the plan would be stable and certain. The increase of production through greater individual and industrial efficiency and the diminished necessity for charitable relief will more than justify the expense involved. Mr. Potts' discussion of the subject is of special interest as coming from an insurance official rather than from a physician, a public health official or a social worker. It is another evidence of the growing interest in social insurance.—*Journal of the American Medical Association.*

A STUDY OF THE PREVALENCE OF *B. COLI* IN SOME TROPICAL SURFACE WATERS, WITH SPECIAL REFERENCE TO SURFACE WATERS OF PANAMA AND SOME WATERS OF MEXICO.

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Read before the Laboratory Section, American Public Health Association, Rochester, N. Y., September 7, 1915.

IN THE field of bacteriological examination of water, there has been much discussion in regard to the prevalence and significance of *B. coli* in surface waters.

As a result, standard methods have been made in different countries in regard to the determination of *B. coli* in water. Since there are a number of "coli types" found, it is very often difficult to draw a line of differentiation between them, and for this reason a water may be condemned when it should not be, or vice versa.

In applying the bacteriological standards of water used in the temperate zone to the water of the tropics, it is often found quite impossible; and if some of these standards were adhered to, many waters could not be passed and would have to be called "unsafe" for drinking purposes. One can readily see how necessary it is to know all conditions surrounding the water under examination before an intelligent report is made.

In making a study of the tropical waters, it is found that lakes, ponds, and tanks, as well as rivers, play a very important part in the water supply of all tropical countries. In dealing with the rivers of the tropics

we appear to be dealing with a subject that has no parallel in the North, so great is the difference between the sewage polluted streams of our northern countries and the great floods, such as the Ganges and Indus of the Far East or the Chagres of the South. It is found that out of the rainy season, the rivers move more slowly than our northern rivers. Of course, towns do exist along the banks, but very few have underground drainage systems which might pollute the rivers. Probably for seven or eight months out of the year most rivers flow under an almost cloudless sky. The sun's rays practically vertical, the amount of evaporation from the surface is great and water clear in many cases.

Among the conditions found that disturb our waters, are, the monsoons in the Far East and the torrential rains in the South. During these periods, there are rapid-flowing seas of muddy water. Six months' accumulation of surface pollution is washed into them in a comparatively few hours; but here again, the majority of such pollution is of animal origin, coming chiefly from cattle, goats, etc.

Many parts of the tropics have been

lands of unpurified water supplies or lands where purification does exist but brought about by natural methods.

No doubt one of the best authorities, or probably the best authority, on tropical waters is Dr. W. W. Clemesha, who has made very extensive investigations of the waters of the Far East.

These investigations covered the study of the bacteriological flora of water and feces from man and other animals, before and after monsoons; a systematic study of shallow wells; and a study of the effect of sunlight on fecal organisms.

The routine examinations consisted of: (1) plating a known volume of water on agar; (2) of inoculating with varying amounts, 0.4, 2 and 5 cc., a tube of MacConkey's medium, bile salt glucose broth; (3) plating on agar for 20- to 40-hour-old growth in this medium; (4) addition to peptone water of 5 cc., testing for indol at end of 48 hours.

The results of Dr. Clemesha's investigations showed that many tropical waters do not contain any "typical coli" as ordinarily defined, but are loaded with bacteria. Some of these organisms would ferment glucose, but not lactose.

Water after being stored contained a much higher per cent. of "non-typical coli" (lactose-glucose+) than do the unstored or raw water.

Sunlight has a very powerful action in destroying fecal organisms in water, particularly when not surrounded by mucus derived from the intestines.

B. coli was found only once or twice in water near surface of reservoir, exposed to sunlight, in the Madras

Presidency during dry weather, and in four cases out of twelve could fecal bacilli only be found in more than 50 cc., while *B. lactis aërogenes* was fairly plentiful.

True *B. coli communis* not present when wide divergence of acid and gas line in two media.

Experiments showed the *B. lactis aërogenes* rare in feces. After certain stage in natural purification multiplies in water.

Dr. Clemesha concluded that—

(1) Water recently polluted gives the same acid and gas line in glucose and lactose medium.

(2) After few days there is a rapid decrease of all fecal organisms irrespective of class.

(3) While lactose-fermenting organisms go on decreasing in numbers, the glucose+lactose—increase or remain stationary.

(4) Fecal organisms more plentiful in bottom than at surface.

(5) The wider the divergence in acid and gas line in glucose and lactose broth, the older is the pollution.

(6) *B. lactis aërogenes* found in small numbers when pollution is recent, but increase in numbers when purification has started.

Dr. Clemesha further concludes—

(1) That it is inadvisable to apply the term "*coli communis*" to a group of organisms or even so-called varieties.

(2) Tests laid down as essential, according to definition quoted, do not go far enough.

(3) It is necessary to separate the individual species of bacilli by well established tests and to study their

characteristics and their position in nature.

(4) That it was advisable to classify all lactose-fermenting organisms according to their ability to resist action of sunlight and on this to base the standard of bacterial purity.

The lactose-fermenting organisms are divided into three classes:

Class 1, the susceptible, containing *B. coli* and allied members, *B. coli* representing the undesirable pollution, because it rapidly dies out from water, therefore its presence causes suspicion.

Class 2, the intermediate, water containing resistant organisms alone, commonly met with in tropics, looked upon as safe.

Class 3, the resistant, containing a mixture of two or more classes.

Standards suggested for tropical water:

Good raw water, as a lake, should contain less than 100 colonies per cc. agar 37°; no lactose fermenters in 50 cc.; no lactose fermenters of class 1; glucose fermenters may be present in 1-5 cc.

Fair lake water should contain not over 400 colonies per cc. agar 37°.

Condemned if contains organisms of class 1 in 1 cc.; if fecal organisms are present in characteristic arrangement of fresh feces; if *B. lactis aërogenes* is scarce; if acid and gas line in glucose and lactose broth is same.

Good river water may contain up to from 100 to 1,000 colonies agar at 37°; lactose fermenters present in 5 cc.; class 1 organisms not present in 20 cc.; glucose organisms present in 1 cc.

River water condemned if it contains countless colonies; if lactose-fermenting fecal organisms present in 10-100 cc.; same with glucose.

After studying the work done by Dr. Clemesha in the Far East in regard to the bacterial content of surface waters in the tropics, I started some investigational work on the waters of Panama, and later on some Mexican waters, using some of the methods carried out in Dr. Clemesha's work.

CANAL ZONE WATER SUPPLIES.

The water supplies of the Canal Zone consist of impounded reservoirs for supplies on Atlantic side of Isthmus and the Chagres River as the supply on the Pacific side of the Isthmus. All of these waters are treated with a coagulant, aluminum sulphate, sedimentated, and filtered through mechanical gravity filters. The supply from Chagres River is also treated with hypochlorite after being filtered.

The watersheds around the reservoirs are policed and no one allowed to trespass on them and no boating or fishing is allowed on the reservoirs.

Thus the only chance for contamination is from wild animals, such as deer, mountain-cow or tapir, wild cats, monkeys, etc.

Water is collected in these reservoirs during the rainy season and held for use during the dry season. We have here real tropical conditions, heavy downpours for about four or five months of the year and then a practically cloudless sky for seven or eight months.

During the dry season the reservoirs act as a sedimentation basin,

and, combined with the action of sunlight, wonderful purification takes place. During this season the bacterial count will drop down as low as 25 and 30 colonies per cc. on agar at 37°. Many examinations may be made during this time of year without getting any test for *B. coli*. However, I did find that *B. lactis aërogenes* grew at this time, but was growing only occasionally during the rainy season. I also found types of bacteria resembling *B. coli* somewhat, but only fermenting glucose and not lactose and having the acid and gas line very wide apart. These results coincide very well with those of Dr. Clemesha in India.

Now during the rainy season, conditions were quite different, as we have the sides of the reservoirs being washed down by the torrential downpours, bringing in much surface contamination. The reservoirs are stirred up, although we only have what is known as a partial turn-over, and the action of sedimentation is stopped for the time being. The sky being clouded, there is no action from the sunlight. The water is not clear as during the dry season, but carries quite a lot of mud and débris washed down from the little ravines.

Examinations of the waters made at this time of year show quite different results. The bacterial count will increase to as high as 1,000 per cc. A few *B. coli* will be found in 5 cc. and occasionally in 1 cc. In examining for *B. coli* other organisms of similar type will often be found long after the true *B. coli communis* has died out. It was always a difficult question to

decide how to classify these bacteria, but using the method suggested by Dr. Clemesha, I readily saw that they could not be classed as true *B. coli communis* and must be called a non-typical type.

Since we had absolute control of the watersheds, and knew that there was no contamination of reservoirs from a human source, the *B. coli* found during the rainy season was never considered a serious matter. There was no question but that it came from animal source.

The water of Gatun Lake was studied as to its bacterial content.

In the early stages of the rise of Gatun Lake, it covered a great area of dense vegetation and jungle growth. A great deal of this work was done when it rose to an elevation of 56 feet above sea level, and at this time its area was 103 square miles, and steeping in its wide expanse of water was a great deal of thick underbrush, rank grass and many varieties of trees. In the warm shallow waters, this vegetation rapidly decayed and for a time gave to the lake a foul odor that tainted the breezes for at least half a mile to leeward.

The water near the edge of lake, which came in close touch with contamination from the banks, showed a high average bacterial count, viz.: 800–1,000 colonies per cc. and *B. coli* in 0.5 cc. Near the centre of the lake, away from vegetation and immediate contamination from shore, there was an average bacterial count of 250–300 per cc. and *B. coli* only in 50 cc. during the rainy season. During the dry season, the bacterial count of

water near shore dropped to an average of 300 per cc. and *B. coli* only in 50 cc. In centre of lake, the average count was 160 per cc. and only occasionally found *B. coli* in 50 cc. This might have come from contamination from small launches which occasionally passed over that part.

The Chagres River, which now furnishes the water supply for the Pacific side of the Isthmus, rises very quickly during the rainy season. There are a few scattered villages along the river, but they are small and of course have no sewers emptying into the river. It is quite natural for the native population to wash their clothes and to bathe themselves in the river, but this is at least ten or fifteen miles beyond where the intake is placed for the Panama water supply.

The bacteriological examination of the Chagres River during the rainy season, at a point about a mile up the river from Gamboa, shows an average count of 700 colonies per cc. and *B. coli* present in 1 cc. samples. During the dry season, *B. coli* was only found in 50 cc. and the count dropped to an average of 300 per cc. Here again were found non-typical types of *B. coli*, non-lactose-fermenting but positive glucose-fermenting; *B. lactis aërogenes* present during the dry season in large numbers.

A STUDY OF SOME MEXICAN WATERS.

The city of Vera Cruz, Mexico, has for its source of water supply the Jamapa River, which receives a short period of sedimentation and then filtered through slow sand filters.

This river runs through a very scantily populated district. None of the villages located along its banks have sewers emptying into it. The source of contamination would be through animals or through surface drainage from privies. Another source would be through the natives washing clothes and bathing in the river.

During the heavy rains, the river would carry much mud in it and run an average bacteriological count of 1,200 per cc. and *B. coli* present in 0.5 cc. Along with the *B. coli* would be some of the non-typical forms.

During the lower stages of the river in the dry season, the count would drop down to an average of 400 per cc. and *B. coli* present in only 20 cc. At this time would be found many *B. lactis aërogenes* and some liquefiers.

In drawing conclusions, I think that the results obtained from my investigation of the surface waters of Isthmus of Panama and one or two streams of Mexico compare very well with many of the results obtained by Dr. Clemesha in his work in the Far East. However, I realize that Dr. Clemesha's work was much more elaborate and was carried on over a longer period of time.

One can see that it would not be just to condemn the waters on account of presence of *B. coli*, and since watersheds of our reservoirs are entirely under our control and well policed, we have a right to feel that the pollution is not from human source.

Thus it does make those who have worked with tropical waters, question, sometimes, the amount of stress that

can be placed on the presence of *B. coli* alone in these waters.

It is further illustrated that the standards used in cold climates must be adjusted to conditions in tropical countries.

(This investigation was carried on when the author was Physiologist of Canal Zone Water Supplies and later Sanitary Expert with the U. S. Expeditionary Forces at Vera Cruz, Mexico.)

The following methods of examination of water were used, as outlined by Dr. W. W. Clemesha:

1. Total colonies in one cc. on agar made according to Standard Methods. Plated and incubated at 37° C. for 48 hours. All colonies visible to naked eye counted.

2. Bile salt broth. Varying quantities of the water are put into fermentation tubes incubated at 37° C. for 18 to 24 hours.

For making sub-cultures, take tube containing 20 cc. water incubated for 18 hours. One loopful of bile salt broth taken out from tube and put into 10 cc. of sterile water. A loopful of this dilution is carried to another 10 cc. of sterile water, and so on to a third. A loopful from tubes 2 and 3 is put on center of plate containing solid medium and spread out with sterile glass rod.

The solid medium is a bile salt neutral red lactose agar. The presence of bile salt and neutral red tend to retard the growth of moulds and air organisms. It is melted into plates 24 hours before use. The plates are incubated at a temperature of 37° C. for 24 to 48 hours. Some colonies appear bright red, others have a red center with pale rims, others were white or yellow.

Having obtained a good plate with 10⁺ to 12 distinct colonies on it, each separate colony is now put through the various sugar reactions, such as 1 Saccharose, 2 Dulcitate, 3 Adonite, 4 Inulin.

LIST OF MEDIA USED IN THE WORK DESCRIBED.

I (Stock solution A).—Bile salt glucose peptone neutral red broth.

Peptone.....60 grms.

Sodium taurocholate....15 grms.

Glucose.....15 grms.

Water.....1 litre.

Neutral red.....10 cc. of 5 per cent. solution.

Normal sodium } Till neutralized as indicated by the neutral red.
Carbonate solution ... }

(B Solution.)

2 parts of A solution + 1 part of water.

(C Solution.)

1 part of A solution + 1 part of water.

(D Solution.)

1 part of A solution + 2 parts of water.

II. Bile salt lactose peptone neutral red broth. Same as above, lactose being substituted for glucose.

III. Bile salt lactose peptone agar.

Peptone.....20 grms.

Sodium taurocholate....5 grms.

Lactose.....10 grms.

Agar.....20 grms.

Water.....1 litre.

Neutral red.....10 cc. of 5 per cent. solution.

Normal sodium..... } Till neutral point is reached as indicated by the neutral red.
Carbonate solution ... }

IV. Bile salt peptone neutral red sugar medium.

Peptone.....10 grms.

Bile Salt.....5 grms.

Sugar.....5 grms.

Water.....1 litre.

Neutral red.....5 cc. of 5 per cent. solution.

To prepare different sugars, the particular sugar is substituted in the column of sugar in the above solution.

The following sugar media are made:

1. Saccharose.

3. Adonite

2. Dulcitate.

4. Inulin.

THE RELATION OF HOUSING TO THE PUBLIC HEALTH MOVEMENT.

BY LAWRENCE VEILLER,

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IT WOULD indeed be a rash man in these days of progress who should attempt to set limits to the public health movement.

When health commissions regulate so many aspects of human welfare from the speed and number of subway trains to the ingredients of proprietary medicines it would surely be unwise to say that any phase of municipal activity is not a proper function of a department of health.

When one considers how many health departments have in past years been buried under the mountain of garbage removal it is not strange that there should be a rather insistent demand for a chance to do what is strictly "health work."

But by what touchstone can the ordinary health officer decide what is properly "health work" and what is not?

Up to the present, there has been no enunciation of principles by such organizations as this to guide him in his determination. He has been forced in most cases to drift with the current, to develop those activities which the public has become accustomed to expect. And, let me whisper it, there have been known instances where he has gotten into a rut, and even, sometimes, where he has been content to stay there!

The basis of the complaint against much of the public health-work of the country is that it is purposeless. It lacks cohesiveness. It does not tend anywhere. Few health officers have developed a program of health work for their community. It is a great thing to take time every once in so often to see where the ship is heading and to set your course anew, if need be; to correct old conceptions, to discard old theories, to get new vision, to sail among the new currents. There is a great exhilaration in steering for a new land, sometimes on an uncharted sea.

If there is as yet no generally accepted standard of what is properly "health work," how is the average health officer to guide his course, determine the limits of his field?

The decision as to what properly is health work is to be reached very much in the same way, as the community itself must reach decisions as to what is properly "municipal work." There is no hard and fast line; no acid test; no municipal litmus paper, by which each community can be guided. What was "Socialism" yesterday, every one today accepts as a matter of course. There are only *principles* to fall back upon!

The health officer must decide his question on the same principle that the

community itself does other municipal ones. It is a very simple one viz: Will it be more beneficial in the long run for the community to do a given piece of work itself or will better results ensue if this particular activity be left to private enterprise.

The health officer has to ask himself two questions with regard to any proposed activity.

(1) Will it promote health?

(2) Can some other branch of the government undertake it more appropriately?

You will note that the question as I ask it is not, "Will it promote *public* health?" but "Will it promote *health*?" The time is rapidly approaching, if it is not already here, when the health official has got to concern himself with private health, the health of the individual as well as with public health, the health of the community; for the community is nothing more nor less than a collection of individuals. The cell theory applied to civics. This has already been demonstrated by ten years of anti-tuberculosis work, where the education of the individual in the measures necessary to protect his health has been the keystone of the movement. So, too, we see this principle accepted in the more widely recognized acceptance of the work of health education which has been so fully discussed in this very conference, and lastly in the principle of life extension, which we are also discussing here and whose very essence resides in personal hygiene.

In the light of these considerations, it is appropriate to ask, "What relation has housing reform to the public

health movement?" The answer to the first of our standard questions, "Does it promote health," will produce no dissenting opinion. As to the *value* of housing reform there is no opportunity for discussion, at least among sanitarians, though I know many speculative builders and slum landlords, however, who are still sceptical about it!

Where difference of opinion will arise will be in answer to the second of our questions "Can it be undertaken more appropriately by some other branch of the government than the health department?"

The organization of our municipal government in most communities in the United States follows along such generally uniform lines that we can without serious difficulty generalize on this subject. In most cities we find a health department, a fire department, a police department, a department of public works, a department of education, a department of parks, of streets, of charities, of correction, of finance. In different cities they sometimes have different names, just as "the ocean receives different names on the various shores it washes." Often, too, they are combined in different ways, in some cities several cognate departments are grouped together in one department of public safety or public works as the case may be. And sometimes they are combined in most *remarkable* ways apparently without the slightest relation to the appropriateness of their functions. In the larger cities, as municipal government becomes more complex, we find increased specialization and the roster of the various

branches of the city government increases. Thus there is added a department of buildings, of docks, of bridges, of water supply, of recreation, etc.

Efficiency in municipal government, as in business affairs, comes with specialization of function. So we may expect to see new departments emerge as the years go by.

As we contemplate this group of branches of municipal government, my hearers will, I am sure, agree with me in saying that their mere enumeration is sufficient in itself to answer the question just asked as to whether any of them can more appropriately undertake the work of housing reform. You would dismiss immediately as a preposterous idea, the suggestion that such work should be undertaken by the department of finance of any city or by its department of education or by its department of streets, or by the police or by the fire department, or by the department of charities, correction of parks. There is an appropriateness here as in other affairs of man.

So, by a process of elimination, we find that housing reform belongs to the health department.

If not performed by that branch of the government, it is safe to assume that it will not be looked after by any. There are of course exceptions to every rule. In some cities there may be exceptional conditions which make it advantageous to separate this work from the city's ordinary health work. But the point I wish to emphasize is that the alternative is not in having this important work an incident to the work of some unrelated branch of the

city government where it will be neglected, but in vesting these functions in a separate department charged with sole responsibility in this field, where it will be given special attention.

New York is a case in point. There fifteen years ago we found a health department buried under the burden of regulating the sanitary condition of 80,000 separate tenement houses, the home of a million and a half of people. As a result, few of its functions were adequately performed. Housing conditions suffered, as did the other health work of the city. So we freed the health department from its burden, by relieving it of this responsibility and established a new branch of the city government—the tenement house department, whose sole function was responsibility for the housing conditions of the people. How necessary the establishment of that department was is evidenced by the fact that today it comprises nearly 800 employees and the financial authorities of the city last year appropriated for its work about \$800,000.

When you come to think of it, it is worth while to look after the home conditions of over three million people.

The results of this readjustment of municipal functions has been quite remarkable. The improvement in housing conditions has been little short of revolutionary. From having the worst housing conditions in the world, New York has come to have in some respects the very best.

The effect on the health work of the city was equally remarkable. Freed from the burden under which it had been struggling for years, the

health department emerged and undertook some of the work which theretofore it had been forced to neglect. From that time, dates its effective work in child hygiene, regulation of the milk supply, medical inspection in the schools, and literally a hundred phases of the work which has made the New York City Health Department the most efficient in the world. It couldn't move before. It was tied hand and foot.

But New York is an exception to the general rule. I should not urge the establishment of a separate branch of the government to look after housing conditions in many other cities—in fact, in no city of the United States except perhaps in Chicago. The reasons which made this course wise to follow in New York, viz., the existence of 80,000 separate buildings housing 1,500,000 people, are not to be found elsewhere. When they are, the same course can be followed, presumably with equal profit.

Although I have said there is no difference of opinion among sanitarians as to the value of housing reform, it may not be inappropriate to consider for a moment how vital a thing it is. The slightest reflection reminds us at once how closely related it is to practically every other phase of health work. What can be more fundamental than the living conditions of the people?

Of what use is it for a city to build tuberculosis hospitals and sanatoria, maintain day camps and dispensaries, employ a corps of visiting nurses and physicians, if all the time tenements with dark unventilated rooms are

breeding the disease faster than the medical profession can cope with it?

How futile it is to send a man away to a sanatorium for six months, feed him, watch over him, nurse him, care for his family at great expense while he is away, then discharge him as "cured," to sleep and live in a three-room tenement of which two of the rooms are little better than dark closets without sunlight—dark unventilated breeders of disease.

How profitable is it for a city to spend vast sums of money to ensure a supply of pure water to its inhabitants and at the same time to allow barbarous privy vaults, sinks of iniquity, to drain their contents into private wells, still used by "conservative" citizens who cling to them with startling tenacity.

Is it more profitable to teach our citizens to "swat the fly" or to do away with their breeding places.

We carefully watch over the health of our school children while in school, but most cities pay little or no attention to the conditions under which they live. We build open air classrooms for them when they have become anemic or tuberculous, but do little or nothing to do away with the dark, damp, air-shaft and basement rooms that have helped to make them so.

I might go on almost indefinitely with these illustrations, but enough has been said, I am sure, to show the vital necessity for every community to look after its housing conditions.

No civilized community can afford to neglect these things. Yet, many that would deeply resent being thought

not civilized tolerate most barbarous conditions. I am happy to say a new era is dawning in this respect. We are at last awakening to this state of things and the necessity for action.

The fight against unsanitary conditions, however, can no more be waged successfully without weapons than can modern warfare be carried on without guns, bombs, shrapnel, barbed wire entanglements, aeroplanes, tools for digging trenches or ammunition. If we are to fight, we must have the tools and engines to fight with. To the sanitarian, the tools are trained men, adequate appropriations, freedom from political interference, security in office.

While I would not urge upon any city the establishment of a separate branch of the city government to look after housing conditions, I *would* urge the creation of a housing bureau in every health department in every city. Until this is done we may expect little progress to be made in housing reform. The work to be done is of sufficient moment to deserve the undivided attention of men especially trained and equipped by experience for it. Without such a bureau neither will adequate funds be provided nor will there be that continuity of service that the subject requires.

There is one element in this subject that has not been touched upon which we cannot afford to lose sight of—one which every experienced health officer will recognize with a sympathetic heart throb, and which every courageous and forward looking one

will go forth valiantly to meet. And that is, that his housing work will produce more friction, encounter more opposition and create more enemies for him than any other phase of his work. I am almost tempted to say than all other phases combined. For, here, he will antagonize not merely one interest; he will touch the pocket nerve of nearly every citizen.

He will in addition have to lift a mountain of inertia, to contend against a satisfaction with things as they are and frequently will have to overcome the opposition of the very men to whom he could most naturally look for support.

But let him not be downhearted, or falter in his course because of this. The work that has no difficulties attached to it, isn't worth the attention of a red-blooded man.

Let him not be discouraged. In the end he will overcome his difficulties. In the recent words of that great statesman Elihu Root:

"There never was a reform in administration in this world which did not have to make its way against the strong feeling of good, honest men, concerned in existing methods of administration, and who saw nothing wrong. It is no impeachment of a man's honesty, his integrity, that he thinks the methods that he is familiar with and in which he is engaged, are all right. But you cannot make any improvement in this world without overriding the satisfaction that men have in things as they are, and of which they are a contented and successful part."

THE RURAL SEWAGE PROBLEM.

ENNION G. WILLIAMS, M. D.,
Health Commissioner of Virginia.

Read before the Public Health Administration and Sanitary Engineering Sections, American Public Health Association, Rochester, N. Y., September 7, 1915.

Dr. Williams emphasizes the importance of discussing rural sewage or a rural problem and remembering that it is not to be dealt with successfully unless it is distinguished from the city problem.

THE rural sewage problem is not only one of privies and law-enforcement but also one of sentiment and education.

Those of us who are connected with state health departments are perhaps most conscious of this truth when we have to deal with the contrast between the people of the cities and those of the rural districts. In the cities we can presuppose a certain amount of popular education on the prevention of disease; in the country we have to begin that education. In the cities men are fully aware of the danger from the diseases of their neighbors; in the country, a man's neighbors may be so far off that he regards their maladies with indifference. In the cities, men readily see the mote in their neighbor's eye and can have the beam in their own pointed out; in the country, the farmer usually does not suffer from his neighbor's shortcomings and does not like to be reminded of his own. In the cities, the householder comes in daily contact with laws and their enforcement and is disciplined to their operation; in the country, the farmer views the law as something to be invoked only in an emergency. In the city, the direct expenditure of money

for comfort and convenience is so habitual that a small outlay for sanitary improvements is seldom considered except by the poor; in the country, the investment of even a few dollars in cash in a privy is regarded by most citizens as a serious matter and the appropriation of public funds for health work is usually regarded as a waste. And so the comparison might be extended to cover a host of differences in our sanitary problems between the congregate life of the city and the distinctly individualistic life of the country.

For our purposes, however, these differences may be summed up in the well-known fact that, despite familiar advantages, many rural sections now suffer more severely than do the cities from the diseases of filth and must, in consequence, be given attention by sanitarians. Ephraim cannot be left to his idols: those idols of insanitation must be destroyed and his health protected.

How to do this is our problem. If we know and can demonstrate beyond all question that failure to have sanitary privies and to use them is responsible for the spread of filth that carries the germs of disease, how can

we make that knowledge a matter of direct moment to the farmer, whose traditions are all to the contrary.

My answer, I suspect, will be a familiar story to those whose work has been along similar lines to my own. We must approach our problem by a process of elimination. In full appreciation of the difference between the city man and the farmer, we must not try at the outset to apply city methods in rural districts. In particular, I think, we must avoid, at the outset, a policy of rigid law-making and law-enforcement. If we pass an ordinance in the cities, providing that every house must have sewer connection, we are usually able to enforce it; if we adopt such a law or regulation for the country, we not only tax to the utmost our resources of inspection but we arouse the antagonism of those who resent being told how they must and must not dispose of their filth. For our part, we have, in Virginia, had recourse to the regulations prescribing sanitary privies only in those communities where popular education has already been had or in extreme cases where there was immediate danger of disease. I must say that I do not feel our work has thus far suffered by our failure to "educate" through warrants and fines.

If, then, we eliminate that weapon which the health officer most frequently uses in the city, what shall we substitute for it. I can give the now familiar answer, education, and seek to define its methods as they apply to the rural sewage problem. The farmer may be resentful of outside suggestion; he may be so stubborn that it takes an epidemic in his vicinity to convince

him. More frequently, however, he is merely ignorant and needs only to be approached in the right manner to be enlisted in behalf of better sewage disposal. We must apply the Baconian maxim tactfully that the wise may learn by reason, men of less understanding by experience and, if need be, the "most brutish" by necessity.

This education must be gradual, it must be diversified and it must, in every instance, be based on common sense. We cannot expect a community to be educated in public health because one of our officers has lectured there a few times and has distributed health literature; we cannot afford to rely too much on a single method of public education; we must not set a sanitary standard in the backwoods to which only the cities can attain.

To consider the last-named essential first, I think it is highly important that we recommend privies of designs proportionate to the means of the householders. Some rich agriculturists can afford to spend several hundred dollars on water-closets and a septic tank; some have the means to install the more elaborate styles of dry closets; some can only afford the simplest devices. If we are to get anything done, it must be by adopting designs simple and inexpensive but safe and practical, while keeping in reserve, for those who may want them, the more elaborate systems. Thus, I am told of a poor but earnest negro who practised a sound gospel of sewage disposal by digging a hole in the ground behind a bush, using this when necessary and keeping it covered with boards when not in use. Manifestly

this was not as desirable or as comfortable as half a dozen devices we recommend. But I need not say it was infinitely better than an untended, open-back privy, where the filth is accessible to flies. On the general principle that men will listen with keener ears when little is asked than when much is demanded, I believe in recommending the simplest, safe privy for general use. It is far better to come below the expectation of the fastidious than to go beyond the means and interest of the humble.

As for diversity in the process of education, I doubt if I can do better than briefly to describe what we have done in Virginia. Our aim is, of course, first to point out the actual and potential danger of the careless disposal of filth and then to show how these dangers can be averted. To these ends we have used bulletins, public lectures, newspaper stories, posters and, in recent months, metal placards which we have tacked to the fences² and³ the store-porches, preëmpting the space formerly used by the patent-medicine advertisers. Largely through these methods, and others upon which I have not time to dwell, we have cut our typhoid morbidity in rural Virginia by almost precisely 50 per cent. in recent years.

But we must, I think, freely admit the limitations to educational methods, it matters not how diversified they may be. Something else is needed if even a gradual betterment in rural sewage disposal is to be had. We must proceed with due regard for the slowness with which a good idea spreads and an inherited way of doing things is laid aside. My own belief is that we must

do as much general educational work as possible and then apply intensive methods. Thus, in my own state, after an active educational propaganda of four years—coupled, of course, with the investigation of outbreaks—we began holding hookworm dispensaries in accordance with the plan of the Rockefeller Sanitary Commission. These dispensaries did much good and gave us an opening for future work, but they did not result in as much direct privy-construction as we had hoped. We have in recent months, therefore, been conducting intensive community campaigns, in coöperation with the International Health Commission. In these we make house to house visitation and have each health officer accompanied by a carpenter with instructions to help any farmer who wants to build a new privy or to render an old one sanitary. In other communities we are trying the experiment of citizens' associations, supporting a visiting nurse. Throughout the state, too, we are doing such extension work as we can through the schools, knowing that our best results are to be had through the rising generations. In the same process, which I have not time to trace in detail, we have the higher goals, of course—the appointment of rural health officers and inspectors and, in the end, the enforcement of law with the same public support we have in the cities. It is a long, long battle. But for my part I believe that we have only to consolidate our victories, so to speak, and proceed with a full recognition of the peculiar nature of our problems to attain the desired end of good health for all the people everywhere.

A PROPOSED BUREAU OF INDUSTRIAL SAFETY, SANITATION AND HYGIENE, TO BE MAINTAINED ON THE MUTUAL PLAN.

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Read before the Industrial Hygiene Section, American Public Health Association, Rochester, N. Y.,
September 7, 1915.

CERTAIN of the industrial diseases and accidents are preventable. This has been proven.

It is no longer necessary to plead that the conservation of life and the preservation of health are humanitarian. It is no longer necessary to demonstrate that a human life is a thing of value. It is no longer necessary to convince the employer that his use of the body and mind of his employee may prove profitable or expensive.

The employer now recognizes his employee as a machine of considerable value, the destruction or injury of which is a source of expense and to be avoided. The workman has come to realize that his brain and his hands are the capital with which he does business, and with this realization has come the knowledge that he must conserve them.

Today the one common bond between capital and labor is the hand of toil, and both are seeking to keep it intact. Employer and employed are working together in a broad safety and welfare movement.

The employer, it would seem, is the one to inaugurate such a movement. His position of control gives him the authority to organize the necessary departments. But the employee must

be given sufficient responsibility to expel the feeling that he is being exploited. Certain welfare movements have failed because the beneficiaries were not duly considered. Some manufacturers have been keen enough to leave these affairs partly in the hands of committees chosen from the workers, a method of administration that has proven effective.

If left to the initiative of the employer, however, conditions of safety, sanitation and welfare will vary from no attempt to highly developed departments. There appears, then, a need to standardize the work. Standardization cannot be accomplished without central control, and the controlling body must be representative of both of the interested parties.

In the Joint Board of Control one finds an exceedingly effective central body. The work of Doctor Price has attracted world-wide attention; he has demonstrated the utility of the method. But Doctor Price is an exceptional man, and the garment makers are exceptional people. Although the work of the Joint Board has proven of much educational value, its methods have not been imitated widely, and the plan is not adapted to all trades.

One must look beyond the Joint Board. One must look to a central

body that is representative of and responsible to all classes. One finds that in the government. Government control is the ultimate solution of the industrial safety and welfare movement.

In Ohio the state departments of labor and health have sensed their responsibility. The health department, through Dr. E. R. Hayhurst, has made a survey of the industrial diseases. The report of this survey is probably the most comprehensive work on the industrial diseases yet published. It has aroused much interest and stimulated activity in the prevention of the neglected occupational diseases. Although the work of the division of industrial diseases has been extended, its scope has been restricted by lack of legal authority, a handicap that undoubtedly will be removed by an early legislature. When Ohio passes the necessary laws, she will find her board of health prepared to exercise control of the industrial diseases.

The industrial commission (department of labor) of Ohio, through its safety director, Victor T. Noonan, has already launched an effective safety campaign. But, as is true of the board of health, the industrial commission has not the authority to act in the capacity of a board of control. Its work at present is largely educational.

Ohio is working along the right lines and will eventually exercise control of industrial safety and hygiene. To be efficient, however, the state departments must have local representation. Every municipal board of health should have a division

of industrial diseases, and there should be a division of city government to work in coöperation with the state department of labor in preventing industrial accidents.

Although state control is an end greatly to be desired, it is obvious that neither the state nor the municipality can carry out the details of prevention. These must always rest with the employer and the man himself. The government can and should show the way; the employer must provide the means; and the men must coöperate.

It is possible for an employer of a thousand or more men to equip his place with an adequate and comparatively inexpensive department of safety and sanitation. He is able to employ a doctor, a safety engineer and a welfare man. In fact, it is profitable for him to do so. A number of the big plants of Ohio have taken up the work of prevention on an elaborate scale.

But the small employer, the one with a dozen or a hundred or so men, cannot install such a department with the full-time service of a physician and other experts. The cost is the obvious obstacle. If he is to have the aid of these specialists, he must share their time with others.

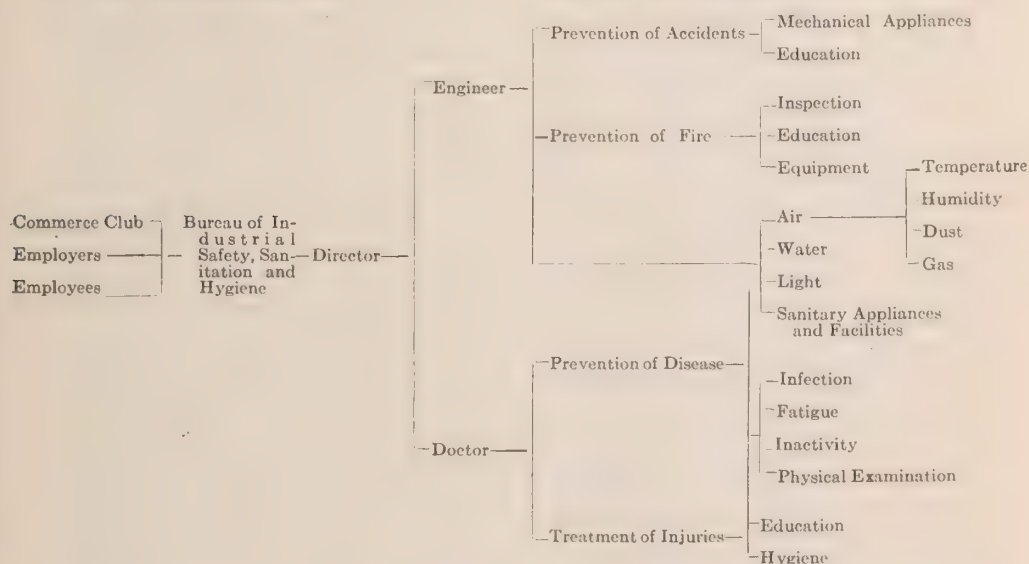
The problem of the small employer suggested the organization in Toledo of a Bureau of Industrial Safety, Sanitation and Hygiene. This bureau is designed to do for the small employer what the large manufacturer is able to do for himself. Its activity displays itself in educational work, the exchange of information, the making of investigations or surveys and the offering of recommendations—in short anything that increases the efficiency of

the employee and lessens the hazard to his health, limb or life.

A manufacturer has a problem. The bureau investigates and offers a solution. A small employer has no safety department. The bureau shows him how to use his limited means and help in organizing one. But details are unnecessary. The utility of such a bureau is evident. Its plan of organization and lines of work are indicated by the following outline:

efficiency makes for commercial prosperity, which is the ultimate attainment of the commerce club.

Such a bureau fits nicely into the general scheme of the movement toward industrial safety. It is not designed in any wise to take up the functions of the various departments of state and local governments organized to prevent industrial diseases and accidents. It does not eliminate the need of a National Council of In-



This bureau is yet a paper organization, with excellent prospects, nevertheless, of soon becoming a living reality. The estimated annual expense is \$12,000. The Commerce Club will probably bear a share of this. The balance will be prorated among the employers subscribing to the bureau according to the number of their employees.

This is a reasonable service for a commerce club. The bureau stands for industrial efficiency. Industrial

dustrial Safety or any society interested in the well-being of the employed classes. It merely represents collectively the small employers in matters of prevention. It aids the government and all organizations interested in the conservation of human life and limb to reach the small employer. It enables the small employer to do for his men what he otherwise could not do. In fact, this bureau is the small employer in matters of industrial safety, sanitation and hygiene.

THE USE OF LIFE TABLES IN PUBLIC HEALTH WORK.

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Read before the Vital Statistics Section, American Public Health Association, Rochester, N. Y., September 10, 1915.

In this paper a man not professionally engaged in public health work but familiar with the difficulties of rendering vital statistics useful in that work and technically trained to cope with such difficulties, discusses some of the important features of "The Book-keeping of Public Health."

IT IS so plain as to be axiomatic that if we wish to improve the health and the longevity of a people, we must, in order to do effective work, first know the facts. Mere impressions will not do, and the one fatal mistake about the inductive method of reasoning is that it is altogether too often applied to wholly insufficient data, resulting in erroneous conclusions.

It is this, quite as much as the want of discernment on the part of those who have handled statistical data, resulting in their failing to apprehend the true significance of the ratios deduced, which has caused the prevailing notion that statistics are misleading. The fact is, on the contrary, that the very basis of all scientific knowledge is the observation of an adequate number of phenomena, the adoption of generalizations based upon such observation and deduction from these generalizations.

That this is true as regards the use of life tables is indicated also by the experience of the country which first collected vital statistics and framed population life tables from the data thus obtained. That country, Sweden,

had already so far advanced in those days in the matter of recognizing the importance of vital statistics that it was even then securing the very information which is essential to the formation on correct principles of life tables, viz.: The births ascertained by means of compulsory registration, the deaths at the various ages ascertained in a similar manner and the population at the various ages ascertained by enumerations at frequent intervals. From the data thus secured population life tables were already being made one hundred and fifty years ago, when Dr. Richard Price was, by painful experiments and proceeding with faulty methods, deducing from the death records alone of a single parish in Northhampton the fallacious and misleading table which, bearing the name of that city, became famous and is still treated with respect by American courts.

The significant thing is that this very country, Sweden, exhibits now and has exhibited for a long time the lowest mortality at practically all ages and the greatest longevity, of all the countries of the world. While this may be, and doubtless is, in part

attributable to the salubrious climate and healthful conditions of the country and to the inherent vitality of the race, it is equally beyond doubt that in large measure it is the direct consequence of the more accurate and reliable information concerning these matters, which the authorities and publicists of Sweden have produced, in the form of the repeated investigations by means of which it has been possible, both to know what the actual mortality experience of the country is and whether it was retrograding or improving in this regard.

It is also obvious that precisely this is fairly to be expected. Wise men, knowing precisely what is happening and what causes are at work, may conceivably modify the results favorably by eliminating or frustrating the unfavorable forces and thus giving the favorable forces full play. It is not to be expected that such modification will be realized if the facts are not known, even though the causes are suspected, since in such case the extent of the operation of these causes is also not known.

These things are commonplaces. The only real issue is, What information should be elicited in order that the use of life tables may be more effective? There are not wanting those who consider that mere general death-rates modified, if that seems to be requisite or desirable, so as to bring them so far as possible upon the same basis, will answer all purposes. There are others also who consider that if the average age is ascertained—which is also, of course, the average expectation of life, roughly, computed from birth—this

should be sufficient and yet others who are confident that if expectations of life are computed by some fairly approximate process for various groups of ages, this will or at least should be satisfactory. There are yet others who urge that general mortality tables or life tables deduced from data of the entire population are precisely what is wanted and that if by any possibility further information is desired it will be sufficient, if a significant comparison can be instituted between this general experience and the special experience within a given group.

In order to consider these various things and their suitability for the purpose, it is necessary first to know that the two things requisite for forming sound conclusions from the observation of the data of vital statistics is that there be no serious defect or error in the data which cannot be allowed for and that the statistics deduced from the data be upon such a basis that comparison will inform the student and not confuse him.

The form in which vital statistics will obviously be most significant and useful is as follows: First, life tables showing the actual mortality rates at the different ages for persons not exposed to special occupational or other hazards, proper distinctions being made also according to (a) race, (b) sex, and (c) age. Second, life tables—or comparison of actual and expected deaths, the latter computed according to the normal or non-hazardous life table corresponding with the experience thus under observation—showing the mortality

rates at the different ages of sections of the population engaged in the various occupations (treated separately) which are by actual test found to be hazardous to life, these sections also being distinguished if possible according to (a) race, (b) sex, and (c) age. Third, life tables showing for occupations found not to be hazardous, the mortality in different sections of the country as in different states separately or in different regions, including a number of states or in cities of a certain size or even a given city.

Certainly this would be the ideal, and one which it would not be impracticable to work to, approximately and with best results. All that would be necessary would be to analyze the data in sections, first; then assembling, as upon preliminary investigation proves to be wise and proper, the bodies of data so as to produce the larger tables.

One of the most serious defects in connection with the vital statistics work which has been done in other countries—and a defect which it ought to be possible for us to avoid in consequence of our undertaking the work later than the other countries, and after having had an opportunity to discover the errors into which they have fallen—is that they have instituted comparison with a so-called general population table, by which is meant a life table deduced from the experience of the entire population of the country, including the lives which are exposed to special hazards, occupational and otherwise. The nature of the error here involved is readily

recognized when it is considered that such a table is affected by the very aberrations from the norm which it is intended to measure and also that from one period of investigation to another this general population life table is thus affected in varying degrees.

This means that such a table is never suitable for comparison of this character and must give misleading results, always underestimating materially the effect of evil conditions; and, in addition, that the use of such tables, deduced from successive investigations, is yet more misleading because they are not equally affected, the proportion of those engaged in hazardous occupations being less at one time and more at another and, therefore, unequally affecting the mortality exhibited by the different general population life tables.

The necessity for a proper starting point or base line from which to make the measurement of the departures has not only not been understood by those engaged in framing population life tables, but also until recently was not understood by the actuaries of insurance companies. So late as the investigation of classified mortality by the Actuarial Society of America in 1903, a population life table, distinguished from a general population life table only in that it was constructed from data collected in so-called healthy districts, was employed as a basis for measuring the extra mortality due to special hazards of occupation and of impaired lives; and it was only in the medico-actuarial investigation just completed that, upon

a suggestion brought forward by myself at a meeting of the Actuarial Society of America, the experience of the companies upon lives accepted as strictly first-class and free from special occupational hazards was collected to form a table which has come to be known as the Medico-Actuarial Select Mortality Table, by means of which the departures of the mortality experience in the various groups of lives, believed to be exposed to special hazards either on account of occupation or on account of some defects in the lives themselves, could be measured with a great degree of accuracy. In consequence of the adoption of this method, it is now found that, notwithstanding the fact that mortality conditions have generally improved, the percentage of excess mortality thus properly measured is very materially greater in practically all cases than the percentages shown by the previous investigation which were arrived at by using a general population table as the standard.

It is clear that if one can put down, side by side, the mortality that would be experienced under favorable conditions among a group of persons at a given age or a small number of consecutive ages and the number of deaths actually experienced under the conditions really prevailing, the facts concerning the influence of these evil conditions are complete and unmistakably manifest. By no other means can so significant and reliable results be secured.

Thus, for instance, as regards the general death-rate as a means of comparing the deaths between one

community and another, it is practically certain in the first place that the distribution of the population by ages will differ in one community from another. The exposures by races and even by sexes will, likewise, be different and the distribution of the various occupations in the community is likely to exhibit even greater divergences. In consequence of these things it is not possible to modify general death-rates so that comparison can be made even approximately upon the same basis nor indeed, were this successfully accomplished, would it necessarily be of any particular value or significance, because it would afford us no information concerning mortality at the different ages or even periods of life nor concerning mortality among the different races or as between the sexes nor concerning mortality as affected by occupation, housing, sanitation or any other of the distinctions which have come rightly to be recognized as most powerful in affecting the death-rate.

In the same way the average age in the community taken as the average period of longevity measured from birth would have, even if it were accurately calculated, very limited significance and value. It would give no information concerning the causes which were at work to produce a lower average age in one country than another, among which varying causes might be a large stream of immigration, causing a greater preponderance of persons at the younger ages, a very large birth-rate with the accompaniment of a large, infantile death-rate, or the destruction of human lives in

their early maturity by the scourges of plagues due to poor sanitation or similar destruction, due to the prevalence of diseases arising from evil occupation conditions. Thus you would have a range all the way from the simple condition of a population heavily recruited by immigration of young people resulting in a low average age, which would have no significance whatever regarding longevity, to the most evil conditions, but of the most variant character, entirely escaping accurate observation and defying classification, if no more information could be commanded than merely average expectation of life.

In a similar manner, that greatly over-valued factor, the expectation of life for each age or for groups of persons within the same five years of age, is found to be fatally defective as a means of supplying illuminating information concerning what is actually taking place regarding the longevity of men upon the earth. In the first place, the expectation of life affords no certain indication of how the deaths are taking place. Theoretically, it could be realized by all who start out from a given age, surviving that precise number of years longer; and equally true is it that theoretically it could be realized by half of them dying immediately and the other half dying at the expiration of a number of years equal to twice the expectation of life. It is also true theoretically that the range of the mortality may vary, back and forward, between these two theoretical possibilities, which, of course, are neither of them practical possibilities. In

other words, expectations of life which are approximately the same might be produced by influences at work which were not at all the same, the only requirement being that the effect in one community is counterbalanced by an equally potent effect in the other community.

Notwithstanding these patent defects, the expectations of life deduced from properly constructed tables or from data properly distinguished according to (a) race, (b) sex, and (c) age, for each community under observation will, of course, be of the highest utility as showing how on the whole the complex of influences at work in each group affects the average longevity; but even in such case it will be necessary in order to observe precisely how these influences operate, to compare the actual death-rates for individual ages or, which may be more convenient, at small groups of ages.

The most valuable, therefore, of all the various things which might be rendered available through the use of population life tables is life tables themselves showing the mortality at the various ages and affording means of comparing the mortality as affected by location, race, sex and occupation. The one additional requisite to render such statistics of the highest value to those interested in the work of the American Health Association is that the causes of death should also be studied. In other words, if we can know first at what rates and through what causes, distinguishing as to the influence of each cause, those die who are shown by the data collected to be engaged in occupations which are not

hazardous we may then by comparing the deaths among persons of the same locality, race and sex engaged in occupations found to be hazardous ascertain not merely the degree of the excess mortality but also the causes for this excess.

Armed with such information, it will be possible to work with intelligence and concentration upon two problems, first, the reduction of mortality among those found not to be exposed to special occupational hazards by the elimination or frustration of causes traceable to heredity, unsanitary conditions or bad customs from the standpoint of hygiene and, second, the improvement of occupational con-

ditions looking to the elimination or great reduction of the special perils to which those engaged in the several occupations are exposed. Without this information, collected and analyzed with as great a degree of accuracy as possible, we shall certainly not be in position to bring to bear upon these problems that intelligence and concentration which would surely be most effective; but, instead, we are likely to be firing volleys into the air and attacking the lesser evils as if they were the greater and failing to appreciate how with the greatest economy of effort we could produce the most valuable and lasting results, if supplied the means to do so.



RURAL OBSTETRICS.

Figures showing that at least 15,000 women die each year in this country from causes connected with childbirth; and that about 7,000 of these die from childbed fever, were quoted by Doctor Meigs, of the Federal Children's Bureau, Washington, in a paper on the care available for the mothers in rural communities, at the recent Seventh Annual Meeting of the American Association for Study and Prevention of Infant Mortality, in Milwaukee.

"Unlike the death-rates of other preventable diseases which show year by year a steady fall," states Doctor Meigs, "the death-rate from conditions connected with childbirth is not decreasing. For 13 years the official figures can show no fall in this rate; during the same time the death-rate from typhoid fever has been cut in half, and that of diphtheria decreased to less than half. These facts show that there is great need for improvement in the care of women at childbirth in this country. We know that women living in country districts in the United States have in general very inadequate care at this important time. This is partly because in many such places pioneer conditions still prevail; in the bare struggle for existence many

necessities of life have to be foregone. It is also due partly to the fact that in the country, as everywhere, people fail to realize the extreme importance of good care at this time of a woman's life; the fact that the money expended for adequate care at this period is the most necessary part of the family budget.

"The Children's Bureau has, during the past year, made studies of the care of women at confinement in rural districts in two states; a northern state, Wisconsin; and a southern state, North Carolina. These studies show widely varying conditions; both, however, show that in many regions women in the country have no skilled supervision during pregnancy, no nursing care before or at labor, no attendant at confinement but a neighbor or relation. Women die, or become permanent invalids through such lack of care.

"A county unit plan may be worked out including a county hospital providing for normal and complicated cases of confinement; nursing service with supervision of women during pregnancy and nursing service at confinement; and skilled attendance at labor."

THE VALUE OF ISOLATION HOSPITALS FOR SMALL CITIES.

CHARLES S. CAVERLY, M. D.,
President, Vermont State Board of Health, Rutland, Vt.

Read before a General Session of the American Public Health Association, Rochester, N. Y., September 10, 1915.

Doctor Caverly is in charge of the public health in a state of small cities, but nevertheless a state in which public health work is conducted along very advanced lines. In this paper he reviews the present situation and points out some of the advantages of the isolation hospital and suggests how rural communities can best proceed to secure one.

MY ACCEPTANCE of the vice-chairman's invitation to speak on the Value of Isolation Hospitals for Small Cities is prompted by what has seemed to me to be a need, rather than because of any special experience I have had with such hospitals.

Most of the larger cities have recognized the usefulness of these hospitals and provided, more or less adequately, hospital care for certain contagious diseases, especially smallpox, diphtheria, scarlet fever, and tuberculosis.

As far as I am able to learn, modern or even comfortable and passably well-equipped hospitals, for the care of these diseases, in rural districts and villages and in small cities of less than 25,000 population, are very exceptional. From correspondence with a few states, taken at random, and representing all sections of the country, these facts were elicited:

There are no such hospitals in this class of cities and towns in New York, with the possible exception of Ogdensburg (Sec. State Board of Charities); none in New Hampshire, with the exception of Concord and Berlin (Sec.

State Board Health); none in Connecticut, except at Greenwich and New London (Sec. State Board Health); none in Florida, except one operated by the State Board of Health at Miami (State Health Officer); none in Louisiana, except isolation wards operated in connection with a general hospital at Shreveport (Pres. State Board of Health); none in Ohio (Sec. State Board Health); none in Washington (Health Commissioner); none in California (Sec. State Board Health). The situation in two states is significantly stated thus: In Rhode Island, the secretary of the State Board of Health says: "The only towns which I know of as having isolation hospitals, which are 25,000 or under, are Newport and Pawtucket. Two or three other towns have buildings isolated in the country, which can hardly be called anything but shacks." The secretary of the State Board of Health of Indiana gives a list of nine small cities in that state having or having had isolation hospitals, with this comment: "Some of these isolation hospitals were simply tents, or partly board and partly canvas.

"In several instances these structures have been burned after small pox has subsided.

"Several other towns have had abandoned or empty houses on their outskirts for detention or isolation hospitals in emergencies."

The experiences of Rhode Island and Indiana, I imagine, represents the experiences of many other parts of the country.

The State Department of Health in Massachusetts, acting under statute, is seeking to secure such hospitals in the smaller cities and larger towns. The Massachusetts law reads in part as follows: "Each city shall, and each town may, and upon the request of the State Department of Health, shall, establish and maintain hospitals for persons having smallpox, diphtheria, scarlet fever, tuberculosis, or other diseases dangerous to the public health as defined by the State Department of Health" with the proviso, that if an arrangement can be made that is satisfactory to the State Department of Health, between cities and towns for the care of such cases, it shall be considered in compliance with law. The cities of Northampton and Clinton have such hospitals and others are under construction or have submitted plans at Adams, Greenfield, Gardner, North Adams and Marlboro (Director Division Communicable Diseases, State Department of Health).

The Vermont law allows towns to combine for purposes of caring for these contagious diseases. The only city having such a hospital is Rutland though several others have now taken steps to provide them.

Modern hospitals, then, for the care of this class of diseases, are exceptional in our smaller cities. Those most recently constructed are connected with general hospitals. The case of Evanston, Ill., seems to be a good example of this.

In our campaign against the contagious diseases, we aim to confine the specific organisms, their cause, to the narrowest possible limits; and to this end we seek to control the movements of the human sources of these organisms, as well as any possible distributors among insects, animals or inanimate objects.

We are learning to attach more and more importance to the human source, the human culture-tube, the case itself. It is the *case* of sickness that is chiefly dangerous. In other words, the contact diseases are spread chiefly by human beings who are either frankly or mildly sick or who are carriers. Inanimate objects, fomites, in most diseases are comparatively harmless, though insects and animals in certain instances must be reckoned with.

In the common contact diseases with which most of our municipalities have to deal, like smallpox, diphtheria, scarlet fever, infantile paralysis, epidemic meningitis, typhoid fever and measles, we institute a house quarantine, as they are reported. This quarantine, in actual practice, differs somewhat in different localities. In most cases it shuts up, under one roof, the sick person, and all persons and things that have been in contact with him.

This quarantine not unusually in-

cludes the wage-earner, and quite regularly school children and others. A barrier is put up between persons and things in, and outside, the infected premises; all this often without regard to size of house or number of inmates.

It is not necessary to dwell on the awkwardness of the situation thus created. Secondary cases, expense to family or city, and a natural feeling of resentment against all health regulations are apt to result.

House quarantine is at best cumbersome, unscientific, and too often ineffective. When several cases of any of these diseases suddenly develop in a small community, it is quite apt to give rise to panic: Hospital facilities are then often demanded and quickly. In the emergency some building, unoccupied, away from near neighbors, and cheap, is hastily secured, a "hospital" improvised, and in this the sick are segregated.

This is, and has always been, the situation and practice in most of our towns and small cities, especially with reference to smallpox.

If facilities for the prompt removal of each case of diphtheria, scarlet fever, smallpox, meningitis, infantile paralysis or even typhoid to a *suitable* isolation hospital were provided, several most desirable ends would be served.

From the private citizen's point of view, the length of time of the house quarantine would be reduced, the breadwinner would be released, and the restrictions, social and school, would be shortened. From the standpoint of the public, one focus of infection would be substituted for several,

perhaps many, and the cost of maintaining many separate quarantines would be reduced.

Most of the larger cities, like the English or other European cities, with their greater needs in crowded housing conditions and their greater resources have provided hospitals for these diseases.

Our smaller cities and rural communities have rarely provided for this need. There are few small cities of 10,000 to 25,000 population, which have no crowded tenements, no slums, in which the appearance of any of these diseases does not point to epidemic conditions, under house quarantine.

Smallpox has ever been the most feared disease in all our communities. Many of our New England towns and cities, and the same condition apparently obtains elsewhere, have a building, little better than a barn or shack, perhaps an abandoned house, located in some remote section, in uninviting surroundings, lacking not only hospital equipment, but frequently the furnishings necessary for comfort, to which the luckless victim of smallpox is unceremoniously removed. This place is known as the "pest house." Lacking such facilities, a costly house quarantine, enforced by special guards, is instituted.

Smallpox, the once-fatal scourge, against which our first public health laws were enacted, has, for a century and a half, been the one disease which public sentiment has permitted to be dignified with special hospital facilities—such as they are. So the only isolation hospital known in most of the smaller municipalities and rural com-

munities is the "pest house," an institution to be dreaded as much, because itself cheerless and comfortless, as the disease which sends one there.

There may conceivably be objections raised in the public mind against any hospital treatment for contagious diseases. With the uninitiated, especially in small places, all hospitals are apt to be unpopular. This feeling is in part a legacy from "pest house" days.

The public, however, on better acquaintance, learn the advantage of general hospitals, and become reconciled to their use. When "pest houses" give place to well-equipped, and well located isolation hospitals, they will not only be tolerated but demanded by the public.

Herein lies opportunity for missionary work by health officials.

The time-honored custom of consigning isolation hospitals to remote, unfrequented sections of a city or town should be abandoned. Indeed the apparently growing practice of locating these hospitals near, and as a branch of general hospitals has decided advantages.

As our knowledge of the methods of spread of contagious diseases grows, we are coming to know that an isolation hospital may not be an altogether undesirable neighbor. The location of an isolation hospital in a desirable residential neighborhood, or even near a general hospital, formerly met strenuous objection. The location of isolation hospitals near to general hospitals has these advantages: the technical equipment and the kitchen of the latter may be utilized under

proper restrictions, and the nurses may be both utilized and given needed instruction in this class of diseases.

The need and value of isolation hospitals in small cities and rural villages vary somewhat with local conditions.

Industrial communities, employing largely young men and women, having a large boarding house population; or such communities using foreign and cheap labor with the living conditions which often go with this, have special needs in this direction. Likewise educational towns, with boys and girls living in dormitories and boarding houses, need the facilities offered by these hospitals. A recent personal experience, in a college town, in which a case of infantile paralysis developed in a boarding house occupied by college girls emphasized this need to me. The difficulty of properly isolating the five or six contacts, in a private house, without risk of further exposure, and under panicky conditions, is not to be lightly regarded.

Under such circumstances an isolation hospital would relieve an awkward situation at minimum inconvenience and cost.

Rural sanitation is just now the subject of comment and criticism. In some states, like my own, with no large cities, it is rural conditions chiefly with which we have to deal.

It is obviously impractical to expect farming towns and villages to support *isolation* hospitals any more than *general*.

The laws of Massachusetts, cited above, offer a practical solution of the rural situation. The town govern-

ment is the rule in New England. The county is the unit of local government in a large part of our country. County *general* hospitals are advocated and even in use, I believe, in some states. The plan of county isolation hospitals naturally belongs to the plan of whole-time county health officers.

When rural towns may legally combine for operating isolation hospitals or rural counties may do this legally, an important step will be taken toward the sanitary redemption of our rural communities. Suburban towns to cities having general hospitals with isolation wards, or independent isolation hospitals, may arrange for the care of contagious cases in these institutions.

While the problem presented is quite different in the small city and rural town and more difficult than in the larger city, the need is as evident.

As far as I am able to learn, no sufficient observations, extending over a considerable period of time, are

available to base definite conclusions on, as to the practical value of these institutions. A study of the mortality and morbidity statistics of the town or city, before and after, would be of first consideration; the financial showing should be secondary.

Theoretically, from either viewpoint, permanent and adequately equipped isolation hospitals are worthy wider use than is now made of them.

SUMMARY.

Real hospitals for the care of contagious diseases are exceptional in small American cities and rural communities.

The control of outbreaks of contagious diseases usually resolves itself into the control of persons.

One well-guarded focus of disease is better than many, unguarded or loosely guarded.

Isolation hospitals are not "pest houses."

Isolation hospitals or wards might to the advantage of all concerned be connected with general hospitals.

Industrial and educational centers especially need the facilities of these hospitals.

Rural communities should combine in support of isolation hospitals, by towns or as counties.



CHANGES IN BUTTER DURING COLD STORAGE.

The causes of rancidity in butter have frequently been investigated by chemists and bacteriologists. Recently the causes for the undesirable flavors sometimes present in cold-storage butter have been sought by dairymen, storage-men and hygienists. It has been generally supposed that rancidity is due to changes taking place in the fats of which butter is principally composed and that the "off-flavors" are merely mild forms of rancidity. After a series of studies on butter which had been prepared under widely varying conditions and stored at 0 F. for varying lengths of time, Dyer concludes that (a) the development of undesirable flavors in storage butter is not dependent on an oxidation of the fat itself; but that (b) it is attributable to a slow process of oxidation progressing in the non-fatty constituents of the buttermilk, and that

(c) the extent of this change is directly proportional to the amount of acid present in the cream from which the butter had been prepared. In other words, the buttermilk supplied the substances which decompose during cold storage and this decomposition is proportional to the amount of acid present in the cream before churning. The experiments showed that butter made from sweet cream had a very mild flavor and kept in good condition almost indefinitely in storage, while the butter from high acidity cream had a high flavor but would not keep well. The remedy consists in preventing the cream from ripening too much, *i. e.*, producing too much acid before churning or, if that has occurred, in washing out the buttermilk from the freshly churned butter with fresh water.—*Journal of the American Medical Association.*

PUBLIC HEALTH WORK THROUGH THE PRESS IN NORTH CAROLINA.

WARREN H. BOOKER, C. E.,

Chief of the Bureau of Engineering and Education, North Carolina State Board of Health.

Read before the General Session, American Public Health Association, Rochester, N. Y., September 8, 1915.

The Journal is presenting this year a number of articles on the educational side of health work. We believe that our readers are finding these articles both interesting and helpful. The educational work of the North Carolina department is well known. This paper by Mr. Booker is therefore one of the valuable contributions to this group of papers.

PRINTER'S ink is blazing the trail for public health work in North Carolina. Yea, it is doing more than that. After the trail is blazed it is printer's ink that levels off the grades and removes many of the obstacles in the road of progress and advancement. Once the way is opened it is printer's ink that keeps it open. It is printer's ink that turns on the gas, that advances the spark, that throws in the clutch and that steers nearly the whole public health machine.

That we may compare mileage, study designs, discuss attachments, exchange experiences and borrow ideas from more experienced drivers is the object of this paper.

DEVELOPMENT.

The first experiment in newspaper health work in North Carolina was begun in 1910 when a series of short articles on health subjects was sent to the press of the state. This original experiment was not altogether the success it was hoped it would be

and after a few months the scheme was discontinued.

In October, 1911, after further study and conference with newspaper men, it was decided to again undertake the experiment of issuing weekly free health material to the press of the state. Accordingly, for a year or more regular weekly articles were mailed to all the papers of the state indiscriminately.

Frequently, more or less promising "leads" or "news" stories presented themselves during the week and so irregular health articles based more or less on news items began to appear at the rate of from one to four or five articles a week.

As an increasingly large amount of the material sent out was finding its way to the printed page in quite a number of the papers, it was decided about a year ago to issue regular daily articles six days a week instead of the irregular articles. There are only about thirty daily and about 225 weekly papers in North Carolina. On account of the cost of postage these

daily articles were sent out each day to the thirty dailies and on Saturdays an entire set of the six daily articles for the week were sent the 225 weekly papers.

Some of the weekly papers registered a complaint, and with just cause, to the effect that the dailies always received the material first. To promote the general cause of peace and harmony among the weeklies, a special weekly article was sent the weekly papers but withheld from the dailies. The latter plan has been proving very satisfactory indeed, as complaints have ceased and as we find that the weekly papers take liberal advantage of the special weekly articles and occasionally use one or more of the daily articles that have already been furnished the daily papers if their space permits and their fancy dictates.

The next step in the development of this newspaper health work has been the issuing of free plate material, or "boiler plate" as it is sometimes called, to fifty of the largest papers of the state that will agree to run such material.

This plan appeals very strongly to the smaller papers, especially the county weeklies where the cost of composition or typesetting is such a considerable item. This plate material is sent out at the rate of a six column page every six weeks with a column released each week. This plate material, of course, does not take the place of the daily news articles, which we still send to the daily papers. By means of sending free plate material to the small county weeklies and others where composition is quite a factor

and daily articles containing health news to the dailies, where news is the chief factor, it is possible to cater to the wants of both classes of papers.

MISTAKES AND EXPERIENCE.

Such, in brief, has been the development of newspaper health work in North Carolina. What turn it will likely take in the future we will not at present venture to predict. That mistakes have been made, and are being made, goes without saying. In some instances we have profited by our mistakes, but it is a long, long way to perfection in almost any line and we have yet very much to learn and perfect.

It was early learned that a reasonable compromise had to be made between what we should have liked to have had published and what our friends, the newspapers, would publish. As publication was voluntary and without pay on the part of the newspapers the compromise was usually very largely in their favor. We soon began to learn, also, that their judgment as to what would and what would not be read by their readers was superior to ours. The mere publishing of a lot of material which practically no one ever reads is just so much lost motion.

In this work it is comparatively easy to judge when one is hitting the bullseye. If our friends, the newspapers, publish the material sent them, we assume that it either approximates what they like, or else that there is a dearth of big news and they are obliged to use our material in the absence of something better. If they

do not publish it we assume that it is because it is not the kind of material they want, or else it is because their columns are already filled with news of *Titanic* disasters, European wars, Zeppelin raids, or political squabbles.

For a writer to ascertain the trouble with his own articles that are not meeting with the desired success in the absence of big news or other obvious space fillers is not usually an easy task. Recognizing that "our best friends are those who tell us of our faults and help us to remedy them," we turn with the utmost frankness and confidence to our friends, the newspapers themselves, and ask them for criticisms and suggestions as to how we can improve the value of our service to their paper, and we never fail to get that for which we ask. Time and space forbid more than enumerating some of the little pitfalls we encountered and some of the little helps we have found. We merely offer a few of them for what they are worth.

For the daily newspapers, news and news while it is news is of prime importance. To plunge into an article and set forth the advantages and desirability of a county hospital, or sanatorium for the treatment of tuberculosis, does not bring the newspaper response nor attract the reader nearly as much as the announcement that county "A" has made a certain appropriation for a tuberculosis hospital while the death-rate from tuberculosis in that county is already lower than the average in the state.

Again, news articles must be short and to the point. This is a busy age and few people have time or patience

for long drawn out articles. A news paragraph of from one to two hundred words or less will usually serve the cause of public health better than the same article drawn out to four or five hundred words.

Few people read newspaper articles entirely through. Practically everybody, however, reads the headlines and a great many read the first sentence or two. Watch your own reading and see if you do not do it, too. Fiction or a magazine article may have the climax at the end but a news story must have it in the headlines and in the first sentence. The remainder of the news item may be a rapid enlargement with details arranged for an easy deduction, but no editorial comment is permissible unless perhaps some one is quoted as in an interview. Editorials and news items do not mix well in the same article.

Human interest material is splendid and should be woven in wherever possible. News stories of babies and children are of more interest than stories of women, and stories of women attract more attention than stories of men. Witness an auto accident in which a little child is run down, another in which a woman is injured and a third in which a man is killed. It is the little child and the woman that draw the headlines while the man is usually mentioned in connection with the widow and the children he leaves behind. The same thing is true with diphtheria in a school and tuberculosis in a factory.

In a certain class of articles local coloring is highly essential. In North Carolina our readers are not so much

interested in knowing about the tuberculosis death-rate in the United States as they are about the rate in North Carolina. Furthermore, it is far more interesting to know that in some health particular that town or county "X" has the highest or lowest rate in the state or that town or county "Y" is second, than to know similar facts as regards states or nations.

Of course, it goes without saying that newspaper health articles should be nontechnical and written with the reader and the purpose of the article kept steadily in mind at all times.

In articles for weekly papers where the news feature is not quite so important, the headlines and first sentence are of even more importance than in news articles for daily papers. In such articles the first sentence should frequently be short and full of "pep, punch and vim." It should be designed to attract attention and to hold interest—in short, to make the reader want to "see what the piece is all about, anyway." An unusual presentation or a "rich, rare and racy" style of treating some important, but perhaps unpopular or threadbare, subject will frequently secure attention from both the editor and the readers, where plain, straightforward statements about the same subject might fail to interest.

COST.

The cost of newspaper health work should not discourage anyone to whom such a field is available. Where weekly articles alone are issued the cost per week should not be over \$2.00 or \$2.50 for the first one hundred

papers served and about \$1.50 for the second and subsequent hundreds. This estimate is exclusive of any charge for editorial service.

Where such newspaper health service is undertaken it will generally be possible to eliminate the editorial item of cost as this can usually be carried on with other educational work or as a part of the regular office routine.

Where daily articles are sent the daily papers the cost for printing, postage, stationery and mailing should not exceed \$2.00 per day for a service to fifty daily papers.

Plate material, exclusive of editorial service, costs \$1.50 per six-column plate delivered to the newspapers in lots of not less than fifty papers. In other words to supply fifty papers with a column of free health material each week, set up in type and ready to run on the press, costs twenty-five cents per paper.

RESULTS.

It is difficult to determine either the direct or the indirect result of this newspaper educational work or health propaganda as carried on in North Carolina. Only approximate figures are available as regards the circulation of many of the papers of the state and only about a fourth of the total number of papers published are received on the exchange desk. However, from questionnaires to the editors, from the papers themselves and other sources of information, it appears that the total circulation of the daily papers is approximately 140,000 and that they use about 20 per cent. of the daily articles sent them, while the total

circulation of the weeklies of the state, exclusive of trade, technical, literary and other publications that could not be expected to use health material, is approximately 600,000, and it is estimated that they use at least 15 per cent. of the weekly articles sent them. The full significance of these figures is better understood when it is remembered that there are only about 400,000 homes in North Carolina. Of the papers receiving free plate material, approximately 75 per cent. of the material is thought to be used. While these are only the roughest kind of approximations, who will venture to measure the value of small daily articles on public health and personal hygiene appearing in a fourth or a

fifth of the daily and weekly papers circulating throughout the state where none have appeared before? It is the continual dropping of water that wears the hardest rock, just so we believe it is the continual hammering on this matter and keeping it before the public that is blazing the trail for public health work in North Carolina. As the newspapers are the text-books, the public schools and perhaps the greatest single source of information and education for nine tenths of our adult population, if we would introduce a course in public health instruction to this all important class of tax payers and voters, we must do it through the public press.



ARSENIC IN "CHEMICALLY PURE" ZINC.

In a study, by means of the Marsh test, of the arsenic content of various body fluids after the injection of salvarsan and arsenobenzol, it became necessary to secure a new supply of metallic zinc, the old supply, which had been proven to be arsenic-free, having been exhausted. Eight samples, which purported to be chemically pure, were examined. These all contained arsenic, though the statements on the labels indicated freedom from this element, the following designations being used: "As, Nil"; "As, none." Even after specifications were submitted requiring arsenic-free zinc, samples of impure zinc were received. The analyses which were being made dealt with amounts of arsenic varying from 1 to 7 parts per million; whereas in 10-gram samples of zinc, marked as previously indicated, amounts varying from 10 to 100 parts of metallic arsenic (1 to 10 parts per million of zinc) were found. The statements on the label of each of these samples indicated that the zinc had been analyzed and found to be free of arsenic. The control tests were carried out with 40 grams of zinc and four times the amount of sulphuric acid used in testing the zinc samples. In no case was any trace of arsenic observed.

However, this is no indication that there was no arsenic present in this control sample. It does mean, however, that arsenic was not present in amounts as large as one part per million in 40 grams of zinc, since the procedure employed was capable of detecting amounts as small as this.

During the past two years, conditions have forced the manufacturers of chemicals to meet extraordinary demands. Those who use their products, either in the manufacture or the analysis of foodstuffs, should see to it that those chemicals and reagents are not contaminated; of this fact the label is not always sufficient or final evidence.

While in medicolegal examinations it is customary to control all procedures most rigidly, and doubtless chemists doing this kind of work always take proper precautions in regard to the purity of their reagents, this note is intended to call the attention of analysts in food, drug, and public-health laboratories to the necessity, when arsenic is being sought, for examining all chemicals for themselves, irrespective of the fact that they are using "analyzed" chemicals.—CHESTER N. MYERS, *U. S. Public Health Report*, Oct. 6.

URBAN AND RURAL CONTROL OF THE FLY PROBLEM.

L. M. McCORMICK,
Asheville, N. C.

Read before the Public Health Administration Section, American Public Health Association, Rochester, N. Y., September 10, 1915.

IN THE beginning was the fly—at least his fossil remains, found in the lower Cambrian rock, indicate that he was one of the very early inhabitants of our globe, and the fact that he has survived under the changing conditions that have thrown into the discard the long series of fishes, reptiles, birds and animals that make the geological history of the globe as fascinating as a fairy tale ought to have made us just a little cautious when we decreed his extermination some ten years ago.

How easy it was to say in our pride, "Git off the earth—I hate you."

"If hate killed men, brother Lawrence, God's blood, would not mine kill you?"

Perhaps Emerson was thinking of the fly when he wrote:

"If the red slayer thinks he slays

Or if the slayer thinks he is slain
They do not know my dubious ways,
I turn and pass and come again."

Fabre, the great French naturalist, after a life-long study of insects, says somewhere in his memoirs, of the intimate, interesting studies of insect life he made, "You will never control our insect pests, for insect life flows through the animal world like water through the soil. To eliminate one, you have to destroy the other."

But this pessimistic view was not

that of L. O. Howard, our honored chief entomologist of the Agricultural Department, for he remarked in his insect book, more than ten years ago, "If we could only get our boards of health in cities to attack the house-fly question and to insist on the proper disposal and keeping of horse manure, the insect would soon become scarce."

Asheville claims the distinction of having been in the front rank of modern fly fighters and is believed to be the first city to pass and train an ordinance directly and specifically against the house-fly, and we have found the joker in this modest challenge of Doctor Howard's to be in the "proper disposal and treatment."

Now, the proper disposal and treatment of manure from the standpoint of the health department sounds simple, and probably any one of the various methods that have been proposed and advocated would be effective under an autocratic government, or one wealthy enough to apply its own remedies. But under working conditions of the city, where the problem is complicated by the conflicting interests of the horse owners of various grades and conditions, and the public at large, the control of the house-fly resolves itself into an educational problem, which involves the life-long and hereditary habits of the horse owner and caretaker, as well as the habits of the

fly in his various stages of development, and the interests of the dining-room, kitchen and sick chamber.

Familiar as the house-fly has always been, the breeding habits have been so diabolically masked by the offensive material chosen for the rearing of the young, as well as the uninteresting neutrality of the species, that even our naturalists had overlooked several very important factors in the life history of the fly, or did not, at first, give them due consideration as elements in the problem of control.

Briefly these are:

First, the moral certainty that all manure dropped in the stable in summer time is fly infected before it can be cleared away under the ordinary and practical conditions.

Second, the remarkable ability of the young imago to reach its "place in the sun," even though barred by seeming impossible obstacle, when it first breaks its chrysalis.

When the imago first crawls out of his pupal case, he has his wings bunched up out of the way in tight knots on his shoulders, his body is as pliable as india rubber and he has full-grown active legs. This is, for him, a most critical period of life. If he finds himself in a tight place, he must get out or die, and his ability to get out is worth studying; if his pupal quiescence has been taken advantage of to plow him under ground, he will dig his way up to light and air; if he finds himself in a test tube, with too many companions for the air, he will squeeze past a tight cotton plug; if he is in a screened manure bin, and the air is bad, he will

work his way through any crack that lets light pass.

Third, in the migratory instincts of the larvæ, which teach it to seek a safe retreat in which to pupate.

The tremendous feeding ability of the larvæ which enables it to increase its bulk more than 100 per cent. every day of its growing period, the time limit of growth, minimum five days, and the dependence of the larvæ on a liberal supply of food and air for its successful growth, are other features to be duly considered.

The failure to give due weight to the first two factors mentioned was responsible for the screened manure bin fallacy, which from its very plausibility, has, in my opinion, been the cause of more anti-fly work failure than any other one thing.

Hardly an ordinance or regulation that has come to my notice but has contained this pitfall.

A screened bin or pit cannot be constructed without sacrificing facility for the removal of contents when necessary. The result is that the screened pit is never thoroughly cleaned and the remnants left behind are only too sure to be a practically pure culture of larvæ and pupa, from which eventually emerges flies to discredit the work.

Some writers have held that this failure exploded the idea that flies could be prevented from breeding, and have urged trapping of the adults as the only remedy left, have started campaigns of swatting, with prizes and banners, that could only result in diverting the available funds, interest, and work from profitable channels.

Traps and fly poisons are useful

makeshifts only, and are about on a par with oils as a mosquito eradicator,—temporary bridges to be discarded when the permanent cause, the breeding places, are eliminated. Their presence as a municipal weapon in a community mark that low level of civic conscience where the indifference of the stable owners is allowed to impose on neighborhood rights.

Larvæ traps are most interesting experiments, and might be available as a municipal weapon if we could depend upon a sustained, intelligent interest of the owners to keep them in working order, and prevent them from becoming mosquito breeders as well as fly breeders; but they have always seemed to me to be too cumbersome and to possess too dangerous a recoil to be recommended as a fly protective measure under ordinary circumstances. However, I hope that Doctor Levy and others who have tried them may discuss their merits further.

Larvicides such as borax, Paris green, and the phenal oils seem to be more hopeful methods than the maggot traps, and have, under my observation, proved very effective, when faithfully and intelligently used. Taking into consideration the very active appetites of the maggots, comparatively little poison is needed, if properly applied, to render the manure pile safe. To be effective, however, whatever larvicide is chosen must be applied to the fresh manure, as a part of the day's routine work.

"Once a week" application or several days apart are futile. As a municipal weapon, these fail because of the uncertainty of the human factor in the

application, and the impracticability of detecting a failure on the part of the stable men to have used them the week before, has caused me to distrust them as a public measure.

But I recommend them freely to individuals who can control their environments, and I have had satisfactory reports from several experiments where they were used intelligently.

At the Biltmore Dairies near Asheville, where about twenty horses and one hundred and fifty cows are kept, Paris green has been used for three years in the horse stables, with satisfactory results. However, this phase of the house-fly control has been so admirably worked out by the U. S. Department of Agriculture, Bureau of Entomology—Cook, Hutchinson and Scales, and made available in their bulletins 118 and 245, that I will not go into details here.

Borax and hellebore are the substances recommended, and when the farmer wakes up to the false economy of letting the fly maggots destroy 25 per cent. or more of one of their most valuable by-products, the horse manure, for lack of a little of the bug poison that they use to save their potatoes and cabbages (which they use the manure to grow), there will be fewer flies on the farm.

I think the first and most important factor in a plan for controlling flies in a town is inspectors, who, by actual observation and breeding experiments, know their flies and all their funny little ways from egg to old age. This should be learned in field work—it can hardly be taught by precept or print. Let the inspector learn how to find the

fly eggs in the manure pile and in the horse stable; how and where to look for maggots, chrysalis and new imago, and with the proper start, he can and will, if he is worth his wages, be able to drive home to the stable owners, the maxim that flies in any neighborhood mean that fly-breeding material (which in a vast majority of cases is stable manure) has been neglected in that locality more than ten days that there is no "royal road to freedom from flies" and that *Clean up and keep clean* is the winning war cry.

Next in order of importance to inspectors come the education of the stable keepers and reformation of the stables. When the man responsible for the condition of the stable learns the life history of the fly—recognizes the eggs, maggots and pupa when he sees them—has found the pupa under an inch or two of soil yards away from the manure pile that he thought had been cleaned up, he realizes the reason for our regulations and can usually be counted on as an active ally, rather than an abused and sullen victim of the crank notion of the health department.

Men are but children of an older growth—and the real thing always appeals, so it is well worth while to arrange a fly-breeding demonstration for the public. One of our principal hardware stores trimmed a window with screens, fly traps and swatters—used our posters and a glass jar containing maggots, and another containing stable manure with ripe pupa. This was placed inside a large bell glass. This window attracted crowds who watched the bell glass from day to day. This window show made more

citizens "clean up" converts than anything else we ever did.

A stable which cannot be thoroughly and easily cleaned is a hopeless handicap to anti-fly work. Washington, D. C.'s regulation that all stables shall have floors that are made of waterproof material is most excellent. The objections that the hard cement floors are bad for the horses is not borne out by the evidence of the stable keepers in Washington. For the stable men there told me that if a horse stood on dirt with his fore feet, a concrete floor for the rear of the stall did not lame the animal. But any stable, even if it has a dirt floor, can be drained and kept dry, thus adding to the comfort of the horse and the facility of cleaning.

In Asheville, for reasons indicated above, we have discarded the screened manure bin and insist that each stable shall be provided with a standard bin, built with the main idea of ease in cleaning, and protection of the soil in or near the stable from manure contamination. Our standard type is a bin 4½ feet wide, 8 feet long and 2 feet deep, with one end left out; all bracings and cleats to be on the outside, leaving a smooth clear floor and sides that can be swept clean when the manure is removed. All manure made each day must be put into this bin for storage, and the stable floor and bedding must be kept clean and dry.

All manure must be removed from these bins and the bin thoroughly cleaned at least once a week. All manure must be taken out of the city during fly time and our citizens are discouraged legally and by public

opinion from using horse manure on gardens and lawns in the summer time. No restrictions are put on such use between November 1 and April 1. Hitch lots are under police control and must be kept clean. Disinfectants, such as Paris green, borax and a soluble cresol solution are recommended, but we do not allow their use to take the place of the weekly clean up.

The large livery and boarding stables have found it more economical to load directly from the stables each day, than to keep a bin which involves double handling of the manure.

There are two or three points in the life history of flies which have a very distinct bearing on the fly control problem, that are difficult to answer definitely.

One of these is "How long does a fly live?" For all practical purposes in field work, we can put this item down as two weeks. Many observations in localities ignorantly infected by spreading fly-infected manure in a territory practically free from flies have convinced me that two weeks will see the finish of the "swarm" if no other infection occurs, and the same time limit is shown in the effect of a "Clean Up and Keep Clean" effort in a fly-infected neighborhood. We can promise that the flies will disappear in two weeks, if the motto is faithfully observed.

In breeding experiments, where several thousand flies were hatched on a given date in a large room, which was screened and ventilated and where food and water was supplied, 10 per cent. died the first week, 50 per cent. were dead at the end of the second week, and all but five were dead on the

twenty-first day; all dead on the twenty-third day. But in this case, many natural causes, such as dissipation, and enemies, were eliminated. This observation, of course, applies only to the summer breeding habits.

The dormant stages and persistent long life of the individuals noted in the winter time is another story.

Doctor Howard in Farmer's bulletin No. 679 records the experiments of Bishop, Dove and Parman, who succeeded in two instances in keeping the species through the winter in the larvæ and pupa stages. It is certain that flies begin to breed very early in the spring. Young larvæ in a fresh manure pile can be found with the first peach blossoms and there are usually two or three broods before the "first flies" are noticed in houses, so that an early start for cleaning up the city is imperative for a successful season's work, and if, as seems probable, the flies are carried over the winter as pupa, concealed in the rubbish around the stable, an added cause is shown for a thorough renovation of the stables and surroundings very early in the season.

Another uncertain point is the range of flies. "How far will flies travel from their birthplace?" Individuals can undoubtedly go long distances. Those who have carried out experiments with marked flies sometimes recover their pets as far away from the base as a mile or more, but in field work, we have found that flies do not ordinarily travel in numbers more than two hundred yards from their breeding place, usually only as far as the first attractive residence or kitchen that will serve as their boarding house.

In the city, in our work, we have usually found the breeding place a neglected stable or perhaps an unsuspected pile of manure in a garden, where there was no stable within a hundred yards of the source of complaint, where the trouble lay in a territory that was cleaned up.

In the country, flies will follow up the odor of cooking a much longer distance, so that some flies will find their way to the kitchen for a quarter of a mile if the wind is right.

So much has been said and so well said about the menace of the fly that I will not further occupy your time. On that point our cleverest writers and cartoonists have found the pages of our most influential journals freely opened to their "song of hate"; but hate kills no one, not even a fly. It takes effort and persistence to reach the source of our evil. I do not wish to seem in this paper to belittle any phase of the work—the enemy is too persistent, and eternal vigilance is necessary to offset his persistence.

Swat the fly, swat him before he gets

his wings—poison, trap, screen, but above all *clean up and keep clean*. And it is thoroughly worth while, we in Asheville believe.

Five years ago, there were eighty-nine cases of typhoid fever located in Asheville. Our campaign against the house-fly, reinforced by a campaign against the unsanitary condition of certain parts of our city, especially the unsewered places, and the open-backed privy, resulted in 1911 in reducing this number to 17 reported cases. In 1912 there were 8 reported, in 1913, 13 reported cases, in 1914, 12, in 1915 to the first of September, 2. We think this reduction worth while.

As typhoid may be considered the index of the health of the people we think that prevalence or absence of flies may be taken as an index to the fundamental cleanliness of the community.

And thoroughly reformed stables will set the pace for the rest of the premises.

Get clean stables and all other unclean spots will follow suit.



POLIOMYELITIS.

E. S. Rosenow, Rochester, Minn., E. B. Towne, Boston, and G. W. Wheeler, New York, report the results of their investigations as to the etiology of epidemic poliomyelitis in a preliminary note in the *Journal A. M. A.*, Oct. 21, 1916. They describe the organisms they have found in considerable detail. It is a peculiar streptococcus which they have obtained from throats, tonsils, and the central nervous system in cases of poliomyelitis. It has produced paralysis in animals of various species when injected into the brain substance, and lesions of the gray matter have been demonstrated. From the nervous system of these animals they were able to isolate this coccus in pure culture but not from their other tissues. It is remarkably polymorphic and seems to grow large or small according to the medium in which it is grown, even after passage through a Berkefeld filter.

With the large form of this organism, paralysis has been consistently produced in animals known to be insusceptible to inoculation with material from epidemic poliomyelitis as heretofore practiced. After paralysis had been produced in three rabbits the strain caused characteristic paralysis and lesions of poliomyelitis in monkeys. The authors do not attempt to give definite conclusions as to the relations of the organism to the etiology of poliomyelitis. It seems to them that the small organism which has been generally accepted as the cause may be the form taken by this organism under anaërobic conditions in the central nervous system and culture mediums, while the larger and more typical streptococcal form may be the same organism grown larger under suitable conditions. The article is illustrated.

SEWAGE DIGESTION TANKS FOR SMALL TOWNS AND CITIES.

G. EVERETT HILL,
New York, N. Y.

Read before the Public Health Administration and Sanitary Engineering Sections, American Public Health Association, Rochester, N. Y., September 7, 1915.

THE United States Census of 1910 records 226 cities having a population of 25,000 or more, and 13,759 incorporated communities with population of less than 25,000. A very considerable percentage of these smaller places are satellites of the cities—dormitories for the families of those who do business in the cities and who think in the terms of wide-awake well-informed city men. These men know the value of good roads and sidewalks, gas and electric current; they realize the necessity of an abundant and pure water supply; and they are now demanding, in increasing numbers, adequate and hygienic sewerage facilities.

More rural communities, roused by admonitions from state health authorities or stirred by a sense of sanitary guilt, are seeking better disposal for their wastes; and each village that installs a sewerage system starts two of its neighbors in the same direction.

But all of these lesser communities, suburban as well as rural, strive vehemently to keep down their tax rates and they usually succeed in doing it. The writer knows of one town of four thousand people, which has thirteen miles of roads most adequately cared for by a street superintendent who is perfectly satisfied with a salary of \$400 a year. Their thrift is most com-

mendable; but it often leads to the postponement of much needed sanitary improvements because the cost—particularly the cost of maintenance—threatens a considerable increase in a low tax rate which is their pride.

Under such circumstances an engineer must seek for every economy compatible with safety. Pumping of sewage must be avoided unless absolutely inevitable, and disposal works must be designed as free as possible from devices which require delicate manipulation or constant supervision. Usually suitable land is reasonably cheap, so that the more artificial and concentrated processes may often be profitably sidetracked for some form of soil filtration as the main factor in purification.

Economy and efficiency are both served by some initial treatment which will remove the bulk of the suspended matter before the purification of the dissolved impurities is undertaken. Coarse screening—enough to withhold the sticks, towels, aprons and other freight which a sewer transports regardless of its charter limitations—is always advisable; but fine screening involves too much labor and invites too much trouble if neglected. Sedimentation removes the solids, but keeps them all to be handled and treated separately. The digestion

tank withholds them equally well and automatically consumes a portion of them. It receives no salary for doing this; therefore it is to be recommended.

The older form of digestion tank—or septic tank, as it is popularly known—consists, per unit, of a single chamber, wherein the velocity of the flowing sewage is checked sufficiently to allow the sedimentation of the heavier suspended matter, which sinks to the bottom as sludge, and the flotation of the lighter soap curds and grease, which rise to the top as a scum, while the more or less clarified liquor slowly passes to the outlet end of the tank and is there drawn off, usually by some type of submerged or scum-trapped collector. The flow is continuous; the detention not overlong—eight hours is ample and safe; and the effluent passes to the filters or to its other destination with its dissolved impurities almost unchanged. The treatment thus far is sedimentation pure and simple. The retained solids, however, remain in the tank until attacked by anaërobic bacteria or by ferments (enzymes) produced by them. In this attack the organic solids are broken up, the less stable portions are liquefied or gasified, and these soluble products, as fast as made, *enter into and pass out with the stream of sewage which is constantly flowing over them.* This is the old-fashioned “one-story” tank, which has done yeoman service.

Developments in the art have indicated that certain distinct advantages accrue from the use of a “two-story” tank, in which the subsiding sludge passes through a gas-trapped opening into a tight lower chamber, where it

becomes absolutely stagnant *and is not washed by the flowing stream of sewage.* In such a tank the clarified liquor is permanently freed from the burden of the suspended matter. No masses of sludge, buoyed up by decomposition-gases, escape with the effluent to load the filters—as happens in the one-story tank; and the liquid requires less oxygen for its ultimate purification than it would if it bore the products of the anaërobic decomposition that goes on in the bottom chamber of the tank. The sludge, when *thoroughly digested*, is much reduced in bulk and is practically inoffensive.

There is unquestioned evidence to show that the two-story tank may be made to yield excellent results, and there is ample justification for its adoption in certain larger installations where the business of sewage treatment is to be carried on scientifically by trained men; but the writer views with some disquietude what seems to be a popular fad for recommending and installing expensive tanks of the Imhoff type in communities which do not need them and will not properly care for them. Mr. G. M. Wisner, in his report on sewage disposal at Chicago, estimates the cost of an Emscher (Imhoff) tank, with settling capacity for three hours' flow, at \$1.44 per capita; and the cost of a single-story tank, with capacity for six hours' flow, at \$0.58 per capita, or only 40 per cent. as much. In many cases the difference in cost is much greater than this, particularly where a tank thirty feet deep is sunk in solid rock or in tide-flooded meadows as recently ob-

served. A two-story tank needs a depth of at least fifteen feet. A one-story tank will work well with eight, or even with seven. The difference in cost is heart-breaking when rock or quicksand is encountered.

Full conviction has not yet been borne in upon the writer that the destruction of sewage sludge is as rapid and complete in a shut-in sludge-chamber as in a simple one-story tank, where the flowing liquid receives and removes, as fast as made, the auto-toxins produced by the reducing organisms. Is it true that these agents are exempt from the wide-reaching biological law which decrees loss of energy or actual death to organisms that remain surrounded by the metabolic products of their own vital functions? We know that many bacteria, notably the pathogenic varieties, succumb to the toxins of their own making. Mr. Fuller has not hesitated to assert that "bacteria come within the scope of that rule, so generally applicable to living matter, that life comes to an end when the growing organisms are not freed in their surroundings of the products of their own growth." This belief has been reiterated in varying forms by most of the writers upon the subject.

Certain incomplete laboratory studies—unfortunately side-tracked by necessary absence, but to be resumed—indicate that after sewage sludge, shut in a closed container, has apparently completed its digestion, and no further change in character or volume can be detected, renewed activity within the sludge itself and a further diminution in volume can be secured by carefully

displacing the supernatant liquor with fresh filtered sewage and maintaining a gentle flow which produces no apparent mechanical disturbance of the sediment. These studies must be repeated, under better conditions, before they are in any way conclusive; but this question is raised now in the hope that discussion may bring enlightenment.

Be this as it may, it seems to be an established fact that the two-story tank requires much more care than the simple one-story tank. An article, by an eminent authority, recently published in *Municipal Engineering*, prescribed the following rules of practice:

Care must be taken to see that alkaline sludge is secured.

The installation of a mechanical agitator (with power, of course) is deemed desirable.

Introduction of compressed air is also advisable.

Sludge should be withdrawn regularly and frequently.

The tanks when drained should be filled with fresh water from the municipal supply.

Lime or soda should be bought and added from time to time.

Very careful attention should be given to the securing of proper balance between upper and lower chambers.

Expert supervision is required.

Such care will not be prohibitive in installations that employ constantly one or more competent men for sewage treatment alone; but for the average small community—and it is for them that this paper is written—where the charge of the sewer system is simply made an added duty of the public factotum who is tax collector, street superintendent, dog catcher and chief of police, the best device seems to be

the foolproof thing that will work well if let alone.

As an illustration of what a single-story tank can do I cite the digestion tank at Wayne, Pa., which was put in commission September 26, 1907, and ran without any removal of sludge until April, 1915. Throughout this time it served on an average 3,200 people. Four thousand are now tributary to it, and the daily flow is about 450,000 to 500,000 gallons. The total solids it received in these seven years and seven months must have been about 1,200 tons. Of course this was not all destroyed in the tank. Much of it passed out in finely divided form and was caught by roughing filters, and some of it was detained by a secondary settling basin (an emptied roughing filter) tried experimentally; but neither roughing filters or sand-beds have ever been renewed (save for ordinary cleaning operations); and two sand-beds, out of a total of eleven with a combined area of 2.11 acres, still take the entire daily flow. The greatest mechanical removal of solids in this time has been the rakings from the sludge-bed which received the drainings of the roughing filters (and secondary settling basin) when these were thrown out of use for aëration. These rakings averaged two and one-half wheelbarrow loads a day. This digestion tank consists of two chambers side by side (a third is held in reserve) each of 85,000 gallons capacity. One is used until sludge ebullition becomes marked. This is then closed and the flow is diverted to the other.

Somewhat similar results were ob-

tained with a simple tank at Mansfield, Ohio, which served 12,000 people and ran four years without cleaning. The sludge then ranged from two to three feet in depth, and it was removed only because an attempt to test the blowoff pipes showed that they were clogged.

Experience at Wayne and elsewhere seems to justify the employment of certain special features of construction. Brief mention of them may be interesting.

Each chamber is built with diverging side walls, so that the tank is narrow at the inlet and widest at the outlet end; and the effluent escapes over a smooth dead-level weir-wall (protected by a scum-retaining apron-wall) that extends all the way across the outlet end. Study of a tank of this type, side by side with one of similar capacity but with parallel walls, showed an apparent gain in sedimentation efficiency of 18 per cent., and a pronounced advantage—unfortunately not determined—in sludge digestion. The former is doubtless due to the reduction of velocity at the outlet end to a speed lower than the average speed through the tank, and the consequent withholding, first, of light flocculent matters which would be carried out by the average velocity, and, second and most important, of a part of the sludge buoyed up near the apron-wall by rising gas bubbles. The gain in digestive capacity is more obscure. It may perhaps be due to the lessening of bacterial antagonism by the approximate segregation in different zones of the many different kinds of reducing bacteria, preferring different foods and following the segregation of the lighter

and heavier solids deposited in different parts of the tank because of the sliding velocity.

Similar results have since been noted by Dr. Schmeitzner, who in his book "Clarification of Sewage" compares the efficiency of a tank at Sheffield, with parallel sides, and one at Viersen, with widening cross-section, and reports the removal efficiency of the former as 49.3 per cent. and of the latter (three tanks) as 82 per cent. Mr. Fuller, in his "Sewage Disposal" (1912), also approves of "a progressive increase in width of tank towards the outlet so as to reduce the velocity of flow."

The long level weir wall serves two important purposes: first, it ensures the withdrawal of the sewage (without increase of velocity until the weir is reached) from the whole end of the tank, thereby maintaining uniform flow from wall to wall; and, second, its length is so great that the escaping liquid creeps over it in a thin film, entirely too shallow to float even small masses of digested sludge. These, when they rise beyond the apron-wall, stop on striking the weir wall and are gradually washed away by the flow in such comminuted form that the individual particles are not visible, and slight momentary discoloration—like a faint streak of smoke—is all that is apparent.

Another item of proved value is a particular form of inlet, designed to "promote completeness of displacement" of the contents of the tank by securing uniform distribution over the whole vertical cross-section at the inlet end. This was adopted after

studying diffusion with inlets of different types and depths in a glass tank filled with clear water, while the inflow contained fine sand, fine powdered clay and aniline dye.

Weir distribution of crude sewage is impracticable; for either the flow over the weir must be heavy enough to cause disturbing currents, or the solids will accumulate in the feed-channel behind the weir.

The inlet mentioned is made of cast-iron pipe. The flow drops vertically from the concrete feed-channel into an elbow set in its invert. This elbow turns from under the channel and delivers horizontally, through a nipple, into the side-inlet of a vertical tee. At the lower end of this tee another elbow carries the flow back under the channel and delivers it horizontally, about two feet under water, *against* the rear wall of the tank, which acts as a diffusion plate and spreads it in all directions before it begins its journey towards the outlet end of the tank. The effect can be readily seen by facing a wall at a distance of one foot and blowing against the wall a gentle stream of cigar smoke. These inlets are spaced under the feed-channel at intervals of about six feet, and the flow to each is simply and effectively adjusted by a series of concentric choke-rings placed in each hole in the invert of the feed-channel. With inlets of this character the distribution is very uniform and neither sludge nor scum is disturbed by the incoming sewage.

In communities where disposal works must lie below or at one end of the town, and where natural drainage

valleys are so very flat that a gradient sufficient for the maintenance of cleansing velocity in a gravity main sewer cannot be had, a well placed digestion tank will sometimes save a pumping plant and all the expense of its maintenance. For the tank can be placed in some central location, with short mains entering it radially; and the clarified effluent, freed from its burden of suspended matter and from the necessity of maintaining a velocity that will carry solids, may flow to the remote filter beds on a flat grade as slowly as it will, so long as it gets out of the way of the water coming behind it. By this simple expedient Southington, Conn., secured a gravity outlet for its effluent instead of pumping it.

Before long the two-story tank may

be displaced by tanks for aëration with activated sludge, or for digestion under the stimulus of brewer's yeast; but these processes, though promising, cannot yet be considered as well established. In their present form they are certainly not applicable to the needs of the average village or town.

The sewage of one community varies so widely from that of another, and so many factors in the problems of sewage disposal are yet undetermined, that results from single-story tanks equivalent to those cited hereinbefore cannot be always assured. But it seems safe to say that for the majority of *small* communities the simpler type of tank is still reasonably efficient and more economical than its more pretentious offspring.



PLAGUE, A DISEASE OF RODENTS.

How plague may be present in rats without making its appearance in man is well illustrated by the experience of the steamship *City of Durham*. The history of this vessel emphasizes what students of the subject know must be true, namely, that throughout the world there are many ports infected with plague in which the presence of the disease is not known because human cases have either not developed at all or not in sufficient numbers to attract attention. Such ports in turn undoubtedly serve as foci from which the infection is carried by rats to ships and thus to other ports.

The steamship *City of Durham* arrived at Hongkong August 23, 1916, without cargo, from Shanghai, China, and proceeded at once alongside of a concrete rat-proof wharf. Immediately upon arrival the ship was fumigated with 4 per cent. sulphur dioxide. After the fumigation six dead rats were found. Examination of these rats showed that two of them were plague infected. The crew of 66 men were immediately examined and none found sick. The captain

stated that no case of human plague had ever occurred aboard his ship.

This steamship is engaged in a general freight trade between New York, Boston, Philadelphia, and ports in the Far East, including Calcutta, Bombay, Rangoon, Vladivostok, Japan ports, Shanghai, Hongkong, and others. On her last voyage the ship left New York June 17, 1916, calling at Colon, Canal Zone; San Francisco, Muroran, Vladivostok, Shanghai and Hongkong in the order named. The master of the ship stated that while en route between Colon and San Francisco a member of the crew died of "internal trouble" June 29 and was buried at sea. On previous voyages the ship had been alongside the wharves at Calcutta and Rangoon, but whenever tied to a wharf standard rat guards had always been used on all lines. It was further stated that rats had very seldom been seen on the ship and the master had never heard of sick or dead rats being found on the vessel.—*U. S. Public Health Reports.*

SOME REMARKS ON ACTIVATED SLUDGE.

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Read before the Sanitary Engineering Section, American Public Health Association, Rochester, N. Y.,
September 9, 1915.

THE literature on the subject of activated sludge is so recent, and so well known to the sanitary engineers of the country, that it appears superfluous to follow the accepted custom, and preface the paper with a digest of the work of other investigators. Reference to points in the literature of the subject will, however, be made where desirable in the body of the present paper. The present writers hope to be able, in addition to presenting some engineering and laboratory data, to draw attention to some general principles which seem to underlie the process.

The Borough of Brooklyn has been coquetting with artificial aëration since 1910, though it must be admitted with candor that, previous to the work beginning in March of the present year, nothing had been developed that gave much promise of economical operation on a large scale. The experiments of Messrs. Black and Phelps were continued in 1914 on a larger scale, using a tank twenty feet high and twelve feet in diameter, holding 16,000 gallons, into the bottom of which compressed air was introduced by means of a grid of perforated iron pipe and which contained nine deflectors designed to impede the passage of air to the top. These deflectors are wooden grids or lattices so arranged

that no bubble of air can pass directly to the top, but must take a zig-zag course.

At low retentions, five hours or so, no perceptible change in quality was apparent, using three to four volumes of air per volume of sewage. When the retention period was lengthened to twenty-four hours, and from fifteen to twenty volumes of air employed, a very fair quality of effluent was obtained, but at prohibitive cost.

In consequence of a visit to Lawrence, the writers fitted up an aërated contact bed, consisting of a fifty-gallon barrel filled with coarse broken stone and provided with means of aëration at the bottom. The results of this treatment, purely from the standpoint of purification effected, were simply wonderful. After five hours' aëration, the liquid drawn from the barrel was practically devoid of suspended matter and, to all intents and purposes, purified. After twenty hours, purification was complete (see Fig. 1). After a couple of months' operation, this unit was abandoned owing to its probably large air consumption and the fact that the stone occupied so large a portion of the tank that, to perform work equal to that of a sprinkling filter, the tanks would need to be very large and the economy would probably be low.

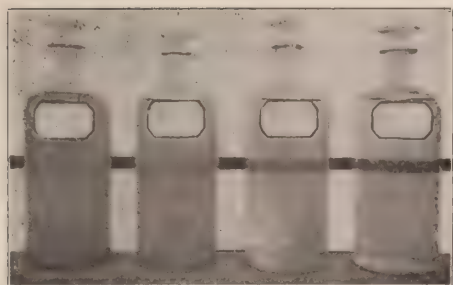


FIG. 1. Samples from "contact aerator" or stone-filled barrel. Note increasing clarity as shown by black band behind bottles.

In all this work, the function of the colloidal films with their myriads of contained bacteria was well recognized, but until the researches of Ardern and Lockett, it was supposed by the authors, in common with the rest of the profession, that the purifying growth must be attached to some medium such as slate or broken stone. Shortly after the publication of the English work, it was decided to make such minor alterations in the aerating tank as would permit the retention of the sludge precipitated by prolonged aeration. An outlet was introduced seven feet above the old one, allowing 6,000 gallons of sludge to remain in the bottom of the tank.

The accumulation of sludge was begun in March and proceeded principally by daily fillings, with an occasional run of several days to produce satisfactory activation. By June 1, the amount of sludge was sufficient to warrant regular cyclical operation, and the following cycle was adopted: 8 a. m., air shut off; sedimentation for one hour; 9 a. m., drawing off begun; 10.30 a. m., drawing completed, air

turned on and filling begun; 12 M., filling completed.

This cycle has been adhered to throughout for two reasons, first, it was desired to have on hand a large supply of thoroughly activated sludge to start experiments in continuous operation, without being compelled to wait for the slow process of activation *in situ*, secondly, because the draft on the pumping plant during the filling of the aerating plant interfered seriously with the rates on the sprinkling filters and it seemed undesirable to have this interruption occur more frequently than once per day.

The following table shows the laboratory results obtained by averages for June, July and part of August.

		Crude Sewage.	Samples at various hours after re-fill				
			0 hrs.	2 hrs.	5 hrs.	20 hrs.	
Susp. Sols.	{ June	180	35	24	20	14	
	{ July	147	21	12	9	8	
	{ August	154	24	12	8	6	
Diss. Ox.	{ June	1.0	0.0	0.1	0.4	2.5	
	{ July . . . . .	.7	0.0	0.0	0.2	1.7
	{ August . . . . .	.5	0.0	0.0	0.1	0.9
Rel. Stab.	{ June . . . . .	..	14	31	76	100
	{ July . . . . .	..	11	34	84	100
	{ August . . . . .	..	12	28	63	88
Ox. Demand	{ June	230	53	38	..	7	
	{ July	173	63	38	..	4	
	{ August	211	53	34	..	11	
Nitrous Nitrogen	{ June . . . . .	..	.08	.11	.49	1.50
	{ July . . . . .	..	.01	.07	.25	.53
	{ August . . . . .	..	.00	.07	.12	.66
Nitric Nitrogen	{ June . . . . .	..	.10	.60	1.20	7.30
	{ July . . . . .	..	.00	.25	1.57	7.80
	{ August . . . . .	..	.00	.10	.55	2.80

Air at 26 cu. ft. per minute.

The tests for suspended solids, nitrification and dissolved oxygen, were made on samples settled in the laboratory, and the tests for relation stability and oxygen demand were made on paper filtered samples, in order to distinguish the effects of the aeration process itself from those of the process of sedimentation which is, in a measure, a separate problem. The demand figures are thus a trifle lower, and the stability figures a bit higher than would otherwise be the case.

This table is particularly interesting for the sake of the conclusions which seem to be legitimate in regard to the basic theory of the activated sludge process.

The rapidity with which the organisms present reduce the demand for oxygen is noteworthy. During the process of refilling, the demand falls from about 200 p.p.m. on the average, to about 60 p.p.m. Part of this drop is, of course, due to dilution with purified liquid from the previous run which remains with the sludge in the part of the tank below the draw-off pipe. Dilution, however, would reduce the demand only to ten sixteenths of its original value, or to 123 parts per million. This demand of sixty-three parts (123-60) is satisfied by the nitrite and nitrate oxygen, which is also reduced much more than the dilution would account for, in addition to the atmospheric oxygen dissolved from the air blown through the tank. This sixty-three parts is seen to be about seven complete saturations at summer temperatures. Bartow and Mohlman (*Jour.*

Eng. and Ind. Chem., April 1915) call attention to the effect of nitrite and nitrate oxygen from the previous cycle in aiding the stability of sewage in the early stages of treatment.

The rate of fall of demand constantly diminishes throughout the cycle, thus conforming to what seems to be a general law of all purification processes, namely, that the action proceeds most rapidly at the start. This would seem to indicate that a given amount of air would be most advantageously utilized by blowing it very rapidly at the beginning, and less so later.

A drop in efficiency is noticeable during August in all points under observation. This is very possibly due to accumulations of sludge in the bottom of the tank which are not lifted by the air and consequently interfere with nitrification. The presence of the deflectors makes direct observation of this point impossible without interruption of the experiment, but indirect evidence supports this theory. There are relatively large areas of the surface undisturbed by bubbling. The suspended matter during aëration is much less than should be there figuring from the suspended solids content of the applied sewage, and the analysis of the sludge seems to show little or no digestion, so the only place that it can be is in the bottom of the tank undisturbed by air.

The phenomena attending the sedimentation of well activated sludge are somewhat interesting. When the quantity is considerable (around 20 per cent. at complete subsidence),

the behavior in a settling cylinder is much the same as that of the precipitate resulting from the addition of manganous sulphate and alkaline iodide to water in the determination of dissolved oxygen. The material subsides as if it were a mass of loose cotton undergoing compression, with a sharp line of demarkation between the suspensa and the supernatant, and not like an aggregation of free falling particles with widely varying rates of subsidence, giving rise to a shading off into clear supernatant. The initial rate of settling in a test recently made, was a trifle over an inch per minute, which rate rapidly diminished as the process of compacting went forward (see Fig. 2).

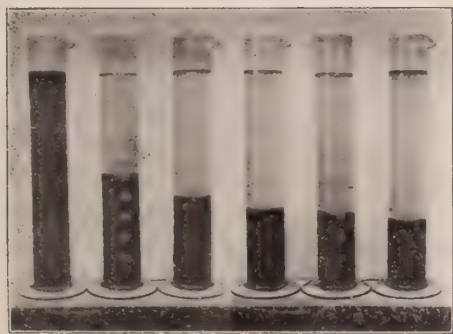


FIG. 2. Illustrating settlement of activated sludge in cylinders at five minute intervals, 0 mins. to 25 mins. inclusive.

Experiments on continuous operation began on July 14. A wooden tank four and a half feet in diameter and eight feet deep having a conical bottom, and holding about nine hundred gallons, was equipped with means for introducing crude sewage near the bottom, and with five carborundum air

diffusers furnished through the courtesy of the Wallace and Tiernan Company who also loaned an air meter (see Fig. 3). The sedimentation

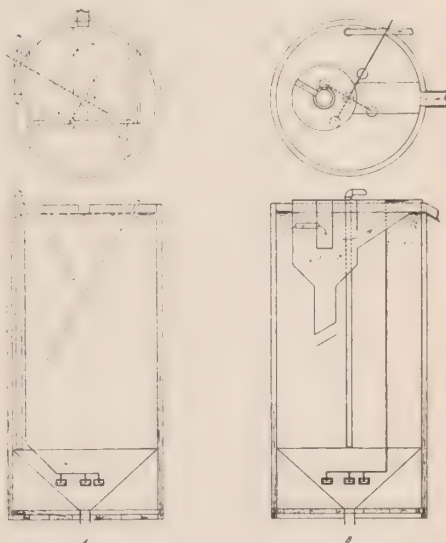


FIG. 3. Plan and section of continuous aerating tank showing both types of sediment compartment.

chamber consisted of a trough built into the top like the settling compartment of an Imhoff tank, the sewage entering at one end of the trough, flowing through it and out at the other end, the sludge settling *en route*, and sliding through the slot into the aëration chamber beneath (see Fig. 3 A). The settling compartment had a capacity of 100 gallons. Air was applied at the rate of .7 cubic feet per minute, and the sewage flowed at the rate of 95 gallons per hour, giving a retention of about eight and one half hours in the aëration chamber, and a trifle over an hour in the sedimentation chamber. This con-

tinuous tank was initially charged with activated sludge from the large fill and draw tank. This operation resulted in a very well clarified effluent most of the time, and the oxygen demand was but 27 p.p.m. on the average, though the relative stability was also low, being but 33 per cent. The principal difficulty encountered with this arrangement was that the commotion in the aëration chamber was frequently communicated to the settling compartment through the slot, giving rise to whirls, which sent the settling material back to the surface, and occasionally over the outlet. This, of course, would probably be much less serious in a larger tank, as the velocity of the whirl would be dissipated before traveling the longer distance to the surface.

To obviate this difficulty, a galvanized iron settling tank was designed and installed with the idea of making the disturbances travel a longer path before reaching the surface (see Fig. 3 B). This consists of a cylinder two feet in diameter and eighteen inches long, a conical bottom whose frustum is twelve inches in depth and a length of galvanized stove pipe about three feet long protected from the direct bubbling of air by means of an inclined baffle. A slight additional period of settlement is provided by a kind of lip, or chute, triangular in longitudinal section, extending from the outer cylinder to the outlet. Sewage enters through a small central cylinder within the larger one, and must travel a devious path before it can leave the tank. The capacity of this sediment chamber is about

sixty-nine gallons, or 7.7 per cent. of the entire capacity of the system.

Operation of the continuous aëerator with this new method of sedimentation began on August 12, using a retention period of eight and three quarters hours of aëration and three quarters hours sedimentation. The results for the first week were most gratifying (see Fig. 4). The effluent was highly

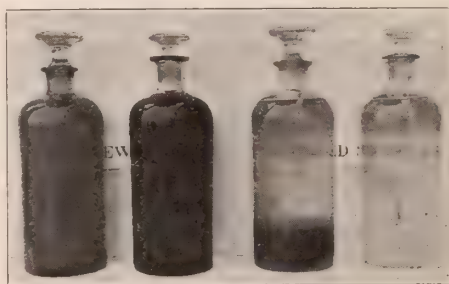


FIG. 4. Samples from continuous activated sludge tank. Bottles from left to right are Crude Sewage, Tank Liquid With Unsettled Sludge, Tank Liquid With Settled Sludge, Final Effluent.

clarified, its demand for oxygen was low, though the absence of dissolved oxygen and nitrates rendered the stability low. Then sedimentation began to be notably imperfect, though the quality of the paper-filtered effluent continued good. The tank was emptied and refilled with a fresh charge of thoroughly activated sludge from the big tank, and the retention reduced to four and one half hours in air and twenty-three minutes sedimentation. This produced a fair removal of floc at first, but the amount soon became large again. This seems to indicate that while a short period of retention will suffice to settle sludge which has been

aërated for 20 hours without any addition of fresh sewage, a longer period is necessary when the operation is going continuously a much shorter aëration period.

The air cost, per million gallons, using Mr. Hatton's assumptions blower and motor efficiency, 73 per cent. and 90 per cent. respectively, and figured current at one cent per K.W.H. is \$1.45 for the nine and one half-hour period, and \$0.69 for the four and one half-hour period. The lowest quotation for current obtainable in New York for this purpose, is two cents per K.W.H.

In closing this paper it is well to call attention to the matter of short-circuiting, or the passage of portions of the sewage through an aëration tank without remaining the entire intended period. Previous writers have mentioned this, and the present authors undertook a mathematical

analysis of the course of events when a portion of sewage small enough to be considered as entering instantly is instantly mixed throughout the tank, the flow continuing constant throughout. This study shows that under the above assumptions but 37 per cent. of the original portion remained to get the full intended aëration. Short-circuiting is a very real fact even in tanks carefully designed to prevent it, as the authors found in the course of experiments with dye on small model tanks, and with the violent churning of the air considered, the mathematical assumption of instantaneous mixture is not so far different from the physical event as many others are. Short-circuiting can be minimized by dividing the retention among several smaller tanks in series, or by using one tank with a length great in proportion to its breadth and height.



HOLES IN THE HARRISON LAW.

In June, Justice Holmes of the United States Supreme Court handed down a decision in the *Jin Fuey Moy* case which interpreted the Harrison Narcotic Act as a revenue measure, controlling dealers and physicians, but in no way holding the mere possessor or user of narcotics liable to the law. This resulted in making it impossible for United States attorneys to continue prosecutions, as formerly under the Act, against mere possessors of the drug. The Texas Statute is far superior and in many instances county attorneys must take up the work of fighting the narcotic evil, in place of the United States attorneys, if results are to be accomplished.

Now comes Federal District Judge Bourquin, in Montana, with a decision, which, if it stands, will exempt the prescribing physician from one of the restrictions placed upon him by the official interpretation of the statute. He decided, in effect, that there is no restriction in the law

against the prescribing of any quantity of a narcotic. He says:

"In said law is nothing prescribing quantities or forbidding orders or prescriptions for the drug in any quantity. Any attempt to find it therein by construction or implication does violence to that elementary principle, that when Legislatures undertake to create offense it must be in language clear and definite, making it obvious to ordinary intelligence that by a certain conduct a crime and the offense denounced by the statute is committed. Hence such construction or implication is never permitted."

It has all along been evident that the law has been so soldered over by departmental rulings as to make a clear view of the statute impossible. The courts are slowly melting this away, until the Act now seems so leaky that unless Congress soon does some recasting it will hold nothing.—*Texas State Journal of Medicine.*

SOME RESULTS OF THE TREATMENT OF THE BALTIMORE DRINKING WATER BY CALCIUM HYPOCHLORITE.*

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Read before the Laboratory Section of the American Public Health Association, Forty-third Annual Meeting,
Rochester, N. Y., September 7-10, 1915.

IN THE following report we shall present the results obtained by the treatment of the Baltimore drinking water during 1911, 1912, 1913 and 1914, by calcium hypochlorite. This will include the reduction of the water and intestinal bacteria and also the decrease in the typhoid morbidity and fatality.

DESCRIPTION OF WATER SUPPLY.

The city of Baltimore is furnished with water from two distinct supplies, namely: the Gunpowder River and the Jones Falls. Both of these streams run through a densely populated rural district in which there are not a few small towns and villages. The water from each source is collected in an impounding reservoir, that of the Gunpowder River being known as Loch Raven, and that of the Jones Falls being known as Lake Roland. The water from Loch Raven then flows through a tunnel 36,500 feet long into the first storage reservoir known as Lake Montebello and thence into three other storage reservoirs, which then distribute the water through the city mains. It probably takes from five to ten days for the water to flow from the impounding reservoir to the city taps.

The water from the Lake Roland impounding reservoir flows through a tunnel 19,000 feet long into a storage reservoir known as Lake Hampden. This is then mixed with water from the Gunpowder Service in a second storage reservoir known as Druid Lake, and from this point it is distributed through the city mains. A certain portion of the city, therefore, is furnished with Gunpowder water and the other portion with a mixture of Gunpowder and Jones Falls water. The unmixed Gunpowder water furnishes 69.2 per cent. of the total amount supplied to the citizens and 30.8 per cent. consists of a mixture of the two supplies. About two thirds of this mixture consist of Jones Falls water and one third Gunpowder water.

AMOUNTS OF CHEMICALS USED.

The treatment of the drinking water with calcium hypochlorite was begun in connection with the Lake Roland supply on June 7, 1911, and the treatment of the Loch Raven supply was commenced on June 22. In the beginning both supplies were treated with .6 part of available chlorine per million parts of water. About the last of June this was increased to 0.75 and in the middle of October it was again increased to 1.0 part per million. No

* From the Bacteriological Laboratory of the State and City Departments of Health, Baltimore, Md.

aluminum sulphate was used during this year.

During 1912, 1.0 part of available chlorine was added to both supplies until April 15, and this practice was usually continued until July 1, but whenever the turbidity rose above 50 the available chlorine was increased to 1.5 parts per million of water. From July 1 until the end of the year the available chlorine equaled 1.5 parts per million parts of water.

Owing to the turbidity of the water it was determined at the beginning of 1913 to add aluminum sulphate in addition to using calcium hypochlorite. The aluminum sulphate was added to the first storage reservoir of the Gunpowder system in order to clarify the water and make the addition of the hypochlorite more effective, and the hypochlorite was added to the effluent of this reservoir after the turbidity had become greatly reduced. In the Lake Roland supply it was necessary to add the aluminum sulphate after the hypochlorite, as there was no way of making a preliminary addition of this material. The amount of aluminum sulphate added varied according to the turbidity, the minimum being .140 grs. per gallon and the maximum 2.532.

With the exception of a few days in January, the amount of available chlorine used on the Gunpowder supply was 0.8 of a part per million which lasted until June, and from then until the middle of September from 1 to 1.5 parts were used. From then until the last of October 2.0 parts were used, and during November this was reduced to 1.75, and during December the available chlorine was further

reduced to 1.5 parts per million parts of water.

The Jones Falls water was treated with 1.5 parts per million from the first of the year until June, but during most of this month 1.25 parts were used. During July until the middle of August 1.5 parts were used, and from then until the end of the year 2.0 parts were used with the exception of the first week to the end of November when 1.75 parts were put into the water.

No aluminum sulphate was added to the Lake Roland water during 1914, but a minimum of .615 and a maximum of 2.065 were added to the Gunpowder supply. The table which follows will show the amount of available chlorine added during the various portions of the year, and this has varied between a minimum of 1.0 and a maximum of 3 parts per million parts of water. The amount during the greater portion of the year, however, has varied between 1.5 and 2.0 parts per million, and larger amounts have only been added occasionally. During the first half of the year 2.0 parts were used for the Lake Roland supply and during the latter half 2.5 parts were used.

BACTERIAL REDUCTION EFFECTED BY THE TREATMENT OF THE WATER.

During 1911 the average monthly general bacterial reduction in the water from the Loch Raven impounding reservoir, as determined by examination of samples from the city taps, varied between 93.7 per cent. and 99.5 per cent., but the percentage of positive tests for the presence of the colon

TABLE 1.

RECORD OF AVAILABLE CHLORINE IN
PARTS PER MILLION USED IN TREAT-
ING THE CITY WATER DURING 1914.

LOCH RAVEN SUPPLY.

1914.	Parts per million.
Jan. 1.....	1.50
May 17.....	1.75
May 18.....	2.00
May 22.....	1.50
May 23.....	2.00
May 25.....	1.50
June 21.....	2.00
June 25.....	1.50
July 2.....	2.00
July 8.....	2.50
July 9.....	2.50
July 11.....	2.00
July 13.....	1.50
July 27.....	2.00
July 28.....	2.50
July 31.....	2.00
Aug. 1.....	2.50
Aug. 3.....	1.50
Aug. 5.....	1.75
Aug. 6.....	2.00
Sept. 2.....	2.50
Sept. 3.....	3.00
Sept. 7.....	2.66
Sept. 9.....	2.00
Sept. 11.....	1.75
Sept. 12.....	1.50
Sept. 18.....	1.00
Sept. 19.....	1.66
Sept. 20.....	2.00
Sept. 21.....	1.50
Sept. 22.....	2.20
Sept. 23.....	2.50
Sept. 26.....	1.50
Sept. 28.....	2.00
Sept. 30.....	1.50
Oct. 30.....	2.50
Oct. 31.....	1.50
Nov. 2.....	2.00
Nov. 4.....	1.50
Nov. 8.....	2.45
Nov. 12.....	1.50
Dec. 9-31.....	2.00

LAKE ROLAND SUPPLY.

Jan. 1.....	2.00
June 27.....	2.25
June 28-December 31.....	2.50

Each date indicates the day upon which the given amount of available chlorine was used and this same amount continued daily until the next date given. It should be understood, therefore that calcium hypochlorite was used daily during the entire year.

bacillus varied between 0 and 12 per cent. in .1 cubic centimeter of water and 12 and 38 per cent. in 1 cubic centimeter of water.

The results from the Lake Roland water were about the same, the average monthly general bacterial reduction varying between 91.1 per cent. and 99.5 per cent. The percentage of positive tests for the colon bacillus varied between 0 and 13 per cent. in .1 of a cubic centimeter and between 10 per cent. and 40 per cent. in 1 cubic centimeter of water.

The yearly average bacterial reduction in the Loch Raven system was 97.5 per cent. and the average of positive tests for the colon bacillus in .1 cubic centimeter was 5.5 and in 1 cubic centimeter it was 30.3 per cent.

The yearly average bacterial reduction in the Lake Roland system was 96.2 per cent. The average of positive tests for the colon bacillus in .1 of a cubic centimeter was 5.1 per cent. and in 1 cubic centimeter it was 26.9 per cent.

During 1912 the minimum average monthly general bacterial reduction in the tap water from the Loch Raven system was 16 per cent. and the maximum reduction was 99.5 per cent.

The city taps were tested in quantities of 1 and 10 cubic centimeters, and the minimum percentage of positive colon tests in 1 cubic centimeter was 5, while the maximum percentage was 72. The minimum percentage in 10 cubic centimeters was 29 and the maximum was 100.

In the water from the Lake Roland system the minimum percentage of monthly bacterial reduction was 44.4

and the maximum was 98.6. The minimum percentage of positive colon bacillus tests in 1 cubic centimeter was 8 and the maximum was 67.

The average yearly bacterial reduction in the tap water from the Loch Raven system was 78.1 per cent. The average yearly percentage of positive colon tests in 1 cubic centimeter was 21.5 and in 10 cubic centimeters it was 55.2.

In the city tap water from the Lake Roland system the average yearly bacterial reduction was 84.0 per cent. The percentage of positive colon tests in 1 cubic centimeter was 34.3 and in 10 cubic centimeters it was 62.9.

During 1913 the minimum average monthly general bacterial reduction in the tap water from the Loch Raven system was 26 per cent. and the maximum bacterial reduction was 99.9 per cent. The minimum percentage of positive colon bacillus tests in 1 cubic centimeter was 0 and the maximum was 29. The minimum percentage in 10 cubic centimeters was 0 and the maximum was 65.

In the water from the Lake Roland system the minimum percentage of average monthly general bacterial reduction was 7.4 and the maximum bacterial reduction was 99.3. The minimum percentage of positive colon bacillus tests in 1 cubic centimeter was 0 and the maximum was 25.

The average yearly bacterial reduction in the tap water from the Loch Raven system was 84.5 per cent. The average yearly percentage of positive colon tests in 1 cubic centimeter was 10 and in 10 cubic centimeters the percentage was 29.8.

In the tap water from the Lake Roland system the average yearly bacterial reduction was 68.9 per cent. The percentage of positive colon bacillus tests in 1 cubic centimeter was 7.8 and in 10 cubic centimeters it was 31.9.

During 1914 the minimum average monthly general bacterial reduction in the tap water from the Loch Raven system was 32.7 per cent. and the maximum was 99.9 per cent. The minimum percentage of positive colon tests in 1 cubic centimeter was 0 and the maximum was 7, while in 10 cubic centimeters the minimum was 0 and the maximum 22.

In the tap water from the Lake Roland system the minimum percentage of average bacterial monthly reduction was 18 and the minimum was 99.9. The minimum percentage of positive colon tests in 1 cubic centimeter was 0 and the maximum was 3, while in 10 cubic centimeters the minimum was 0 and the maximum was 26.

The yearly average bacterial reduction in the tap water from the Loch Raven system was 92.6 per cent. The yearly average percentage of positive colon tests in 1 cubic centimeter was 1.8 and in 10 cubic centimeters was 11.1.

In the city tap water from the Lake Roland system the yearly average bacterial reduction was 83.8 per cent. The average percentage of positive colon tests in 1 cubic centimeter was .66 and in 10 cubic centimeters was 8.

In 1914 larger amounts of hypochlorite were used than in former years, and the effect upon the Loch Raven system was satisfactory. The

general average monthly bacterial reduction usually ranged from 98 to 99 per cent., and in 1 cubic centimeter of water the percentage of positive colon tests was very small. In 10 cubic centimeters it has been variable, but never above 20 per cent. The following table shows the results of the bacteriological examinations for this year as expressed in monthly averages. This table is published in detail in order to show what may be accomplished in purifying a polluted water supply when hypochlorite is used alone, or is preceded by sedimentation with aluminum sulphate.

As previously stated, aluminum sulphate was used on the Loch Raven supply in order to decrease the turbidity before treatment with calcium hypochlorite, but only hypochlorite was used for the Lake Roland supply.

The tables for 1914 follow, and the term "Raw water" indicates the untreated supply, "Storage," the treated water in the storage reservoirs, and "City taps," the water as delivered to the citizens.

RELATION BETWEEN AVAILABLE
CHLORINE USED FOR TREATMENT
AND RESIDUAL CHLORINE IN THE
CITY TAP WATER.

The relation of the amount of available chlorine used in treating the drinking water to the amount of residual chlorine found after treatment is an important subject, as it is not desirable to have too much residual chlorine left in the water. The results in Table 4 which are given below were obtained with water usually showing a low turbidity, since this water had

previously been treated with aluminum sulphate. The range of turbidity has been given for the ten days preceding the time that the tests for residual chlorine were made from the city taps. This range of turbidity was used since our experience has shown that the treated water might take anywhere from one to ten days to arrive at the city taps, although the usual time is much less than ten days. The range of turbidity is stated in the table and the amount of available chlorine which was being used during the ten days previous to the test for available chlorine is also stated in the table. The turbidity is expressed according to the scale adopted for the silica standard described in Standard Methods for the Examination of Water and Sewage.

This table shows that when 1.5 parts of available chlorine per million parts of water were used there is practically no residual chlorine in the water. In one case when 1.75 parts were used there was a large amount of residual chlorine, giving an average from the twenty-four wards of .574. On another occasion, however, when this amount was used the residual chlorine was less, giving an average of 0.24 per million parts of water. When 2.0 parts of available chlorine were used there was an average from the twenty-four wards of 0.206, and when 2.5 parts of available chlorine were used for treatment there was an average of 0.62 parts per million parts of water. These results, therefore, are somewhat variable, and it is hard to explain the greater amount of residual chlorine when 1.75 parts were used

Treatment of Baltimore Drinking Water

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TABLE 2.
LOCH RAVEN SYSTEM, 1914.

Months, water.	No. exam- inations.	Average bacteria per cc.	Percent- age of bacterial reduction.	Percentage of positive colon tests.			
				0.01 cc.	0.1 cc.	1 cc.	10 cc.
January	Raw water.....	15	14,000	16	66	88	100
	Storage.....	26	2	99.9	0	0	0
	City taps.....	48	27	99.8	..	2	2
February	Raw water.....	18	7,000	21	68	84	100
	Storage.....	21	21	99.7	0	0	0
	City taps.....	15	80	98.9	..	0	20
March	Raw water.....	13	20,000	16	25	83	100
	Storage.....	24	29	99.8	0	0	0
	City taps.....	25	225	98.9	..	0	3
April	Raw water.....	9	5,500	14	14	28	57
	Storage.....	20	110	98.0	0	0	0
	City taps.....	45	3,700	32.7	..	0	2
May	Raw water.....	11	80,000	15	31	69	85
	Storage.....	24	1,600	98.0	0	4	31
	City taps.....	51	12,000	85.0	..	4	9
June	Raw water.....	14	12,000	20	53	80	100
	Storage.....	24	2,000	83.3	0	4	15
	City taps.....	42	55	99.6	..	3	17
July	Raw water.....	13	8,100	28	71	88	100
	Storage.....	13	210	97.4	0	12	38
	City taps.....	27	12	99.9	..	7	22
August	Raw water.....	24	19,500	29	71	87	100
	Storage.....	27	1,800	90.8	0	11	29
	City taps.....	30	75	99.6	..	3	13
September	Raw water.....	15	4,500	5	44	78	100
	Storage.....	15	500	88.9	0	13	39
	City taps.....	23	70	98.5	..	0	17
October	Raw water.....	23	7,900	17	79	100	100
	Storage.....	22	1,000	87.3	0	8	35
	City taps.....	33	50	99.4	..	3	15
November	Raw water.....	14	175,000	13	27	60	93
	Storage.....	13	400	99.8	0	4	9
	City taps.....	30	60	99.9	..	0	14
December	Raw water.....	13	350,000	33	67	78	100
	Storage.....	18	275	99.9	0	0	11
	City taps.....	12	2,000	99.4	..	0	0

TABLE 3.
LAKE ROLAND SYSTEM, 1914.

Months, water.		No. exam- inations.	Average bacteria per cc.	Percent- age of bacterial reduction.	Percentage of positive colon tests.			
					0.01 cc.	0.1 cc.	1 cc.	10 cc.
January	{ Raw water.....	25	90,000	....	12	64	100	100
	{ Storage.....	25	1,400	98.5	0	0	0	12
	{ City taps.....	47	50	99.9	..	..	0	0
February	{ Raw water.....	21	25,000	....	0	13	56	91
	{ Storage.....	20	3,900	84.4	0	0	4	30
	{ City taps.....	15	85	99.7	..	..	0	13
March	{ Raw water.....	22	4,400	....	0	4	35	81
	{ Storage.....	22	3,600	18.2	0	0	0	4
	{ City taps.....	36	1,000	77.3	..	..	0	0
April	{ Raw water.....	19	5,500	....	0	0	14	76
	{ Storage.....	22	2,100	61.8	0	0	0	9
	{ City taps.....	45	4,500	18.2	..	..	0	2
May	{ Raw water.....	17	21,000	....	6	23	53	88
	{ Storage.....	25	11,000	47.6	0	0	4	24
	{ City taps.....	51	12,500	40.5	..	..	2	11
June	{ Raw water.....	25	14,000	....	0	16	40	68
	{ Storage.....	25	1,200	91.4	0	0	24	36
	{ City taps.....	42	70	99.5	..	..	3	14
July	{ Raw water.....	20	20,000	....	20	48	84	100
	{ Storage.....	22	650	96.8	0	0	27	50
	{ City taps.....	26	50	99.8	..	..	0	26
August	{ Raw water.....	13	99,000	....	25	75	95	100
	{ Storage.....	14	1,100	98.9	0	5	40	65
	{ City taps.....	28	950	99.1	..	..	0	11
September	{ Raw water.....	19	25,500	....	20	60	90	100
	{ Storage.....	20	2,800	89.0	0	24	48	67
	{ City taps.....	24	125	99.5	..	..	0	0
October	{ Raw water.....	24	4,200	....	24	48	68	100
	{ Storage.....	25	650	84.5	15	59	74	96
	{ City taps.....	32	50	98.8	..	..	3	6
November	{ Raw water.....	20	16,000	....	4	40	67	92
	{ Storage.....	17	1,700	89.4	0	33	37	62
	{ City taps.....	30	65	99.6	..	..	0	13
December	{ Raw water.....	23	29,000	....	9	56	96	100
	{ Storage.....	24	3,800	86.9	0	0	0	56
	{ City taps.....	12	7,800	73.1	..	..	0	0

TABLE 4.

RESIDUAL CHLORINE IN CITY WATER, EXPRESSED IN PARTS PER MILLION.

Wards.	Oct. 16, 1913.	Nov. 20, 1913.	Jan. 15, 1914.	Jan. 24, 1915.	Feb. 15, 1915.
First.....	.282	.560	.03	0.8	0.36
Second.....	None	.400	.02	0.4	0.32
Third.....	.432	.700	.03	0.7	0.36
Fourth.....	.372	.700	.03	1.0	0.40
Fifth.....	.252	.480	.03	0.8	0.35
Sixth.....	.282	.320	.03	0.6	0.06
Seventh.....	.192	.560	.02	0.6	0.22
Eighth.....	.132	.616	.03	0.9	0.70
Ninth.....	.192	.584	.03	0.8	0.40
Tenth.....	.132	.560	.02	0.6	0.26
Eleventh.....	.192	.560	.03	0.6	0.28
Twelfth.....	.192	.400	.03	0.6	0.04
Thirteenth.....	.192	.400	.02	0.6	0.22
Fourteenth.....	.252	.480	.03	0.9	0.22
Fifteenth.....	.192	.480	.03	0.8	0.26
Sixteenth.....	.192	.640	.03	0.8	0.36
Seventeenth.....	.192	.720	.04	0.5	0.22
Eighteenth.....	.072	.640	.04	0.6	0.00
Nineteenth.....	.180	.480	.02	0.4	0.16
Twentieth.....	.192	.720	.04	0.4	0.10
Twenty-first.....	.072	.700	.03	0.4	0.22
Twenty-second.....	.192	.560	.03	0.5	0.00
Twenty-third.....	.432	.760	.03	0.6	0.30
Twenty-fourth.....	.132	.760	.03	0.0	0.06
Average content for 24 wards.....	.206	.574	.029	0.62	0.24
Available chlorine used for treatment of water in parts per million.....	2.0	1.75	1.50	2.5	1.75
Turbidity of treated water.....	From 5 to 13	From 5 to 12	From 5 to 14	From 15 to 50	From 4 to 11

than when 2.0 parts were used. The amount of residual chlorine, however, may be influenced by other things besides turbidity, as temperature and unknown conditions may influence the absorption of the chlorine.

This table, however, has been instructive to us since we have come to the conclusion that less than 2.0 parts of available chlorine per million parts of water cannot always be relied upon to thoroughly disinfect the water and prevent the water-borne typhoid. It would seem, therefore, that a small

amount of residual chlorine in the water after treatment is really necessary in order to insure proper disinfection of the water.

It is also appreciated that the table of residual chlorine does not express results which might be obtained if a water with a greater turbidity were being treated. By the use of aluminum sulphate, however, in the treatment of the Baltimore drinking water we were able to keep the turbidity below 30 with very few exceptions, so that when preliminary sedimentation

with aluminum sulphate is being used and the turbidity is kept below 30 the table may act as somewhat of a guide for indicating the amount of residual chlorine which may be left when varying amounts of available chlorine are being used for treating the water.

REDUCTION IN THE TYPHOID MORBIDITY AND FATALITY.

In 1911 the treatment of the water by calcium hypochlorite was begun and the number of cases reported during that year was 1,201 and the number of deaths 154. In 1912 the cases were reduced to 1,083 and the deaths to 136. In 1913 there was a slight increase of reported cases, these numbering 1,163, but the deaths were again 136, and in 1914 the reported cases dropped to 757 and the deaths to 130.

The decrease in typhoid fever caused by the hypochlorite treatment of the water can be seen by consulting chart No. 1 which gives the typhoid death-rate per 100,000 of population from 1890 to 1914 inclusive. The maximum rate before the use of calcium hypochlorite was in 1890 and was 54.4, and the minimum was in 1909, being 24.7. The average from 1890 to 1910 inclusive, being the period during which hypochlorite was not used, was 38.9. The maximum from 1911 to 1914 inclusive was 27.4 and the minimum was 22.2, the average being 24.3. This is a decided reduction when compared to 38.9 during the former period during which the water was not treated.

The special effect of a reduction in the amount of calcium hypochlorite

can be seen in chart No. 2 which shows the typhoid cases by months from 1910 to 1914 inclusive, and the average of cases from 1906 to 1910 before the hypochlorite was used. In July, August, September and October, 1913, the rise in the number of reported cases of typhoid fever can be seen, as indicated by the arrows. During 1913 from June until the middle of August only 1.0 part of available chlorine was used in treating the Gunpowder supply which furnishes most of the water for the city. This was increased on the 18th of August to 1.5 parts, but even this increase did not seem sufficient to effect a drop in the number of cases reported. In the middle of September 2.0 parts of available chlorine were used and there was a decided drop beginning about the middle of October and becoming much more marked during November and December of this year.

It should also be noted in considering the drop in the number of reported cases and deaths from typhoid fever since the treatment of the water by calcium hypochlorite that a number of cesspits have been gradually abandoned in Baltimore during these years, owing to the installation of a new sewerage system. In the earlier years of the treatment, however, a very small percentage of these cesspits had been abandoned and the immediate drop in the typhoid death-rate and reported cases would indicate that the treatment by calcium hypochlorite has had a marked effect in reducing the typhoid fever in Baltimore.

CHART No. I

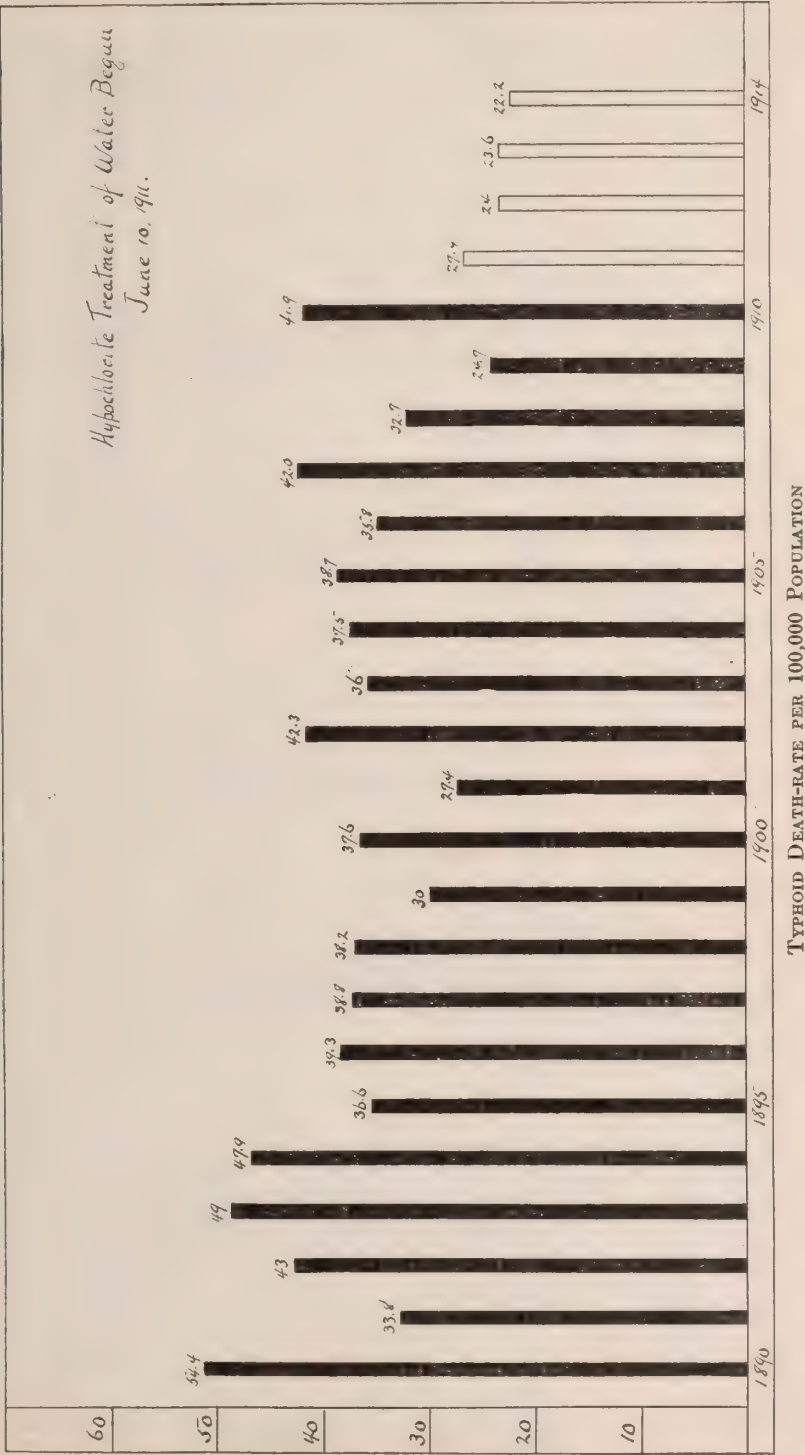
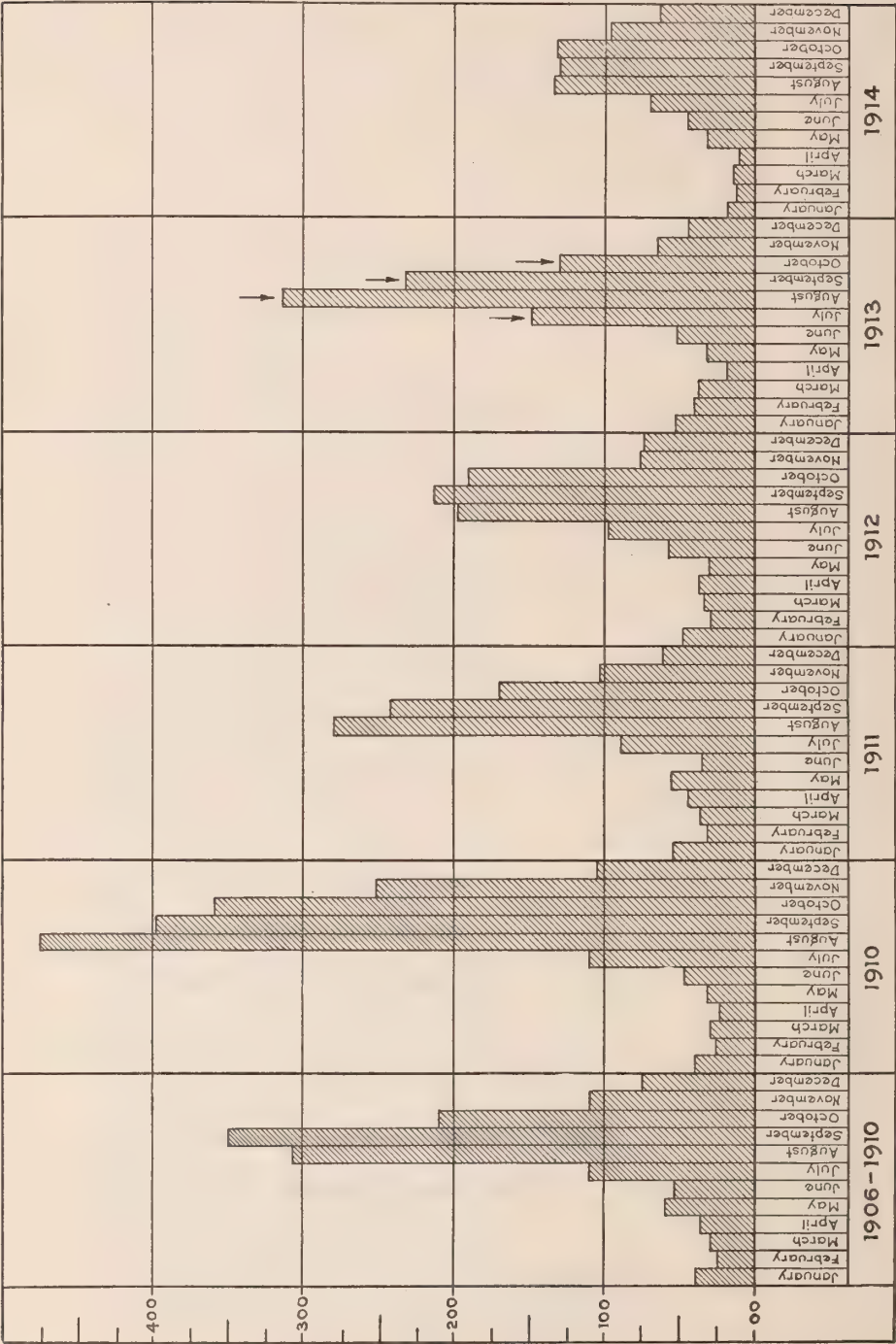


CHART N^o II



Typhoid Cases by Months

CONCLUSIONS.

The best temporary method for the treatment of the Baltimore drinking water until the filtration plant is completed is the preliminary use of aluminum sulphate in the storage reservoirs followed by the treatment of the clear water by calcium hypochlorite. During the winter months from 1.5 to 1.75 parts of available chlorine per million parts of water should be used and during the summer months 2.0 parts should be used when the turbidity is below 30. When this rises above 30, which is only occasionally, 2.0 parts should be used in the winter and 2.5 parts in summer.

This treatment has effected a reduction in the reported cases and deaths from typhoid fever in Baltimore, but the method has only been used as a

temporary expedient until the filtration plant can be completed. The use of calcium hypochlorite in these amounts will produce a reduction of about 99 per cent. in the number of water bacteria present, and positive colon tests in 1 cc. of water can almost be eliminated. In 10 cc. of water, however, a fair percentage of positive tests will still be noted.

In conclusion we wish to thank Mr. Ezra B. Whitman and Mr. Robert L. Clemmitt, the Water Engineers who directed the treatment of the drinking water, Mr. J. Bosley Thomas, Director of the Laboratory of the Water Department, from whom we have obtained much valuable data, and Dr. Frederick C. Blank, Chief and Chemist to the Bureau of Food and Dairy Inspection of the Baltimore Health Department for the chemical analyses.



METAL-MINE ACCIDENTS IN THE UNITED STATES DURING THE CALENDAR YEAR 1915.

COMPILED BY ALBERT H. FAY, BUREAU OF MINES.

There was a slight decrease in the number of men killed in the metal mines of the United States in 1915 as compared with 1914, the total number killed as reported to the Bureau of Mines, Department of the Interior, by the operators being 553 in 1915 as compared with 559 in 1914, 683 in 1913, 661 in 1912, and 695 in 1911. The number of men reported employed, however, during 1915 was slightly less than the previous year, the numbers being 152,118 in 1915 as compared with 158,115 in 1914. The fatality rate, therefore, for 1915 was slightly higher than for the preceding year, being 3.64 per 1,000 men employed in 1915 as against

3.54 per 1,000 for 1914; 3.57 in 1913; 3.91 in 1912; and 4.19 for 1911.

There were reported 35,295 non-fatal injuries for 1915, of which thirty-five were permanent total disability; 574 permanent partial disability; 7,242 other injuries of a temporary nature involving a loss of more than fourteen days, and 27,144 minor injuries wherein the time lost was one to fourteen days. The non-fatal injury rate per 1,000 men employed was 232 as compared with 191 for 1914. This increase is not necessarily significant of an increased hazard, but the real dangers are more nearly set forth by reason of better records at the mines and more complete reports to the bureau.

REPORT OF SPECIAL COMMITTEE ON INFANTILE PARALYSIS.

ON the first day of the recent Cincinnati meetings of the American Public Health Association, the following preamble and resolution was presented by Dr. E. P. Lachapelle of Montreal and seconded by Dr. Frederick Montizambert of Ottawa.

In view of the fact that Infantile Paralysis has existed for several months and still exists in the United States and Canada, taking on in some localities an epidemic character; that considerable anxiety is expressed by the public generally, and that they, the public, the physicians and the health authorities may well expect an authoritative statement upon the subject from this Association in Annual Convention assembled.

Be it Resolved: That the President be forthwith authorized to appoint a small committee of specialists and of those who have had experience of the disease with instructions to meet immediately and to prepare a report of the present actual knowledge of the cause of the disease, the manner and agents by which it is spread, the best methods of treatment, and the best preventive measures.

And that this committee submit its report before the close of this Annual Meeting; and that such report be given to the public immediately.

The resolution committee of the Association unanimously approved of the above resolution and in accordance with it the President, Dr. John F. Anderson, appointed the following special committee: Dr. Haven Emerson, Commissioner of Health, New York City;

Dr. Wade Frost, United States Public Health Service, Cincinnati, O.; Dr. A. J. Chesley, Epidemiologist, Minnesota State Board of Health, Minneapolis, Minn. The report of this committee is appended herewith. The Association at its meeting on Friday afternoon, October 27, unanimously approved and adopted the report.

The Committee of the American Public Health Association, appointed by the President to report upon the subject of poliomyelitis, begs to submit the following:

The specific cause of poliomyelitis is a microörganism, a so-called virus, which may be positively identified at present only by its production of poliomyelitis in monkeys experimentally inoculated. Such experiments have shown this virus to be present not only in the nervous tissues and certain other organs of persons who have died of poliomyelitis, but also in the nose, mouth and bowel discharges of patients suffering from the disease. It has been proved by similar experiments that healthy associates of poliomyelitis cases may harbor the virus in their noses and throats.

These experiments, together with the fact that monkeys have been infected by direct application of the virus to the mucous membrane of the nose and by feeding of the virus, are strong evidence that in nature infection may be directly spread from person to person.

Observations on the occurrence of the disease might seem at first thought to be inconsistent with this conception, since contact between recognized cases can seldom be traced. However, this may be adequately explained by the lack of means for detecting mild non-paralytic cases, and by the belief that healthy carriers of the virus and undetected cases are considerably more numerous than frankly paralyzed cases.

Many facts, such as the seasonal incidence and rural prevalence of the disease, have seemed to indicate that some insect or animal host, as yet unrecognized, may be a necessary factor in the spread of poliomyelitis, but specific evidence to this effect is lacking, and the weight of present opinion inclines to the view that poliomyelitis is exclusively a human disease, and is spread by personal contact, whatever other causes may be found to contribute to its spread. In personal contact we mean to include all the usual opportunities, direct or indirect, immediate or intermediate, for the transference of body discharges from person to person, having in mind as a possibility that the infection may occur through contaminated food.

The incubation period has not been definitely established in human beings. The information at hand indicates that it is less than two weeks, and probably in the great majority of cases, between three and eight days.

If the foregoing conception of the disease is correct, it is obvious that effective preventive measures, approaching complete control, are impracticable, because isolation of recog-

nized cases of the disease and restraint upon their immediate associates must fail to prevent the spread of infection by unrecognized cases and carriers.

These difficulties would appear to be inherent in the nature of the disease. Nevertheless, we may hope for the development of more thorough knowledge which will permit of more effective control of the disease than is now practicable. Of first importance is the more general recognition by practitioners of non-paralytic cases through clinical observation and laboratory procedures.

Lumbar puncture has been shown to offer valuable aid in diagnosis, and a more general use of this test is to be encouraged, since it not only facilitates accurate and early diagnosis, but in many cases affords symptomatic relief as a therapeutic procedure. Without undertaking to predict the future progress of research, we may hope for certain possible developments which may afford far more effective control of the disease, with substantial relief from many inconveniences at present inevitable. Among these possibilities we would include: a practical test for the detection of all clinical types and carriers; a simple and reliable test for distinguishing between susceptible and insusceptible persons; and means of conferring artificial immunity against poliomyelitis.

At present our information demands the employment of the following administrative procedures in attempting to control the disease:

1. The requirement that all recognized and suspected cases be promptly reported.

2. Isolation of patients in screened premises. The duration of infectivity being unknown, the period of isolation must necessarily be arbitrary. Six weeks has been recommended by the Conference of State and Territorial Health Officers with the Surgeon-General of the Public Health Service as sufficient, and this period has been generally accepted throughout the United States.

3. Disinfection of all body discharges.

4. Restriction of the movements of intimate associates of the patient so far as practicable. This should include at least exclusion of the children of the family from schools and other gatherings.

5. Protection of children so far as possible from contact with other children or with the general public during epidemics.

6. Observation of contacts for two weeks after the last exposure.

There is no specific treatment of established value in poliomyelitis. During the persistence of the acute symptoms of the disease the important principles of treatment are rest in bed, symptomatic relief, and passive support for the prevention of deformities. Active measures during this stage are not only useless but are apt to cause serious and often permanent injury. Hospitalization of patients where possible is to be encouraged. The best chances of recovery from residual paralysis demand skillful after care, often long continued, and always under the direction of a physician familiar with the neurological and orthopedic principles of treatment. The provision of such after care often becomes a community problem, demanding the coöperation of all available agencies, social and professional.



MR. STRONG'S REPORT ON STATE CHARITIES.

"On Friday of last week Governor Whitman made public the report of Charles H. Strong, his special commissioner appointed a year ago to examine into the management and affairs of the New York State Board of Charities, of several related boards and commissions, and also into the charges brought by the city Department of Public Charities against the inspections by the state board of private institutions receiving money from New York city.

"Mr. Strong upholds the charges of the city and recommends a thorough reorganization of the State Board of Charities, as well as the abolition of several boards and commissions. A critical estimate of his conclusions will appear later in the *Survey*. Only a summary of his major findings will be given here.

"The city proved its case, Mr. Strong finds, 'out of the pages of the state board's own inspection reports.' Private institutions receiving money from New York city and subject to the inspection of the state board care for more than 25,000 dependent children. The charge that many of these institutions were 'unfit for human habitation' Mr. Strong declares untrue. This was made in the testimony before him of John A. Kingsbury, city commissioner of public charities. On the other hand, the charge that conditions in many of these institutions bearing the certificate of approval of the state board were 'such as to be little less than public scandal and disgrace,' Mr. Strong finds to be true. This was made in Mr. Kingsbury's report to Mayor Mitchel, which was forwarded to the governor and formed the basis for including this phase of the inquiry in Mr. Strong's commission. Seven, at least, of the twenty-four institutions on the city's controverted list must be thus described, says Mr. Strong.

"For permitting such conditions to grow up and to continue Mr. Strong finds the state board responsible. . . ."—*Survey*, November 4.

Book Reviews.

American Public Health Protection. Henry B. Hemenway. *Bobbs-Merrill & Co., Indianapolis, Ind., 1916. Price, \$1.25 net.*

This book shows that in spite of the short comings of the American social structure we have come a long ways in the protection of public health. The frames of the constitution gave the matter no concern, and very clearly made no provision for it. As the growth of the commonwealth demonstrated the necessity for such protection, the law makers have slowly responded to the demand, and the courts have gradually widened the interpretation given the welfare and commerce clauses of the constitution in order to approve the validity of such laws.

Nevertheless, our best accomplishments in the control of disease have been in lands under the control of our War Department, and Hemenway quotes Bryce as showing that these accomplishments were possible because the central autocratic authority was not limited by laws, or even by democracy. The accomplishments were not by reason of Americanism, but rather in spite of it.

Again, he quotes MacDonald's comment upon the American government, that it erred in leaving all power save that specifically vested in the central government, in the local government. MacDonald was advocating a basic law for Canada under which all power was in the central government save that specifically conferred on the provinces.

Hemenway is clearly in favor of a centralized autocratic authority, but pending its accomplishment, he insists in this book, as he has in his other works, that all acts of all administrators shall take the fullest cognizance of all the laws based upon all the decisions. It is not always easy to make these two points of view coincide.

The law of procedure is always reactionary. To bring about a centralized autocratic health authority requires that law shall remain in a state of flux.

The author refers to his legal arguments to prove that under the constitution the National government has the right to directly collect vital statistics, reports of births, deaths and morbidity, marriages and divorces not at ten-year intervals, but day by day.

If this be granted, and he tells us that the highest legal authorities recognize its validity, it will inevitably follow that in time other skillful legal minds will be able to assemble proofs, scientific, sociologic and legal, for the taking over of such work for the people's welfare as the books of the Vital Statistics Department show to be necessary or advantageous for the welfare of the state.

But it is not in the interest of the people that such authority should be granted health officers until those holding such positions are better qualified than they now are. In order that they shall be better qualified, the author makes several suggestions. The first is, that the public should not dabble too much in health matters. "In the place of trying to decide how dairies should be managed, they should make sure that a competent health officer is employed and then follow his lead." There would be advantages in this plan, but we cannot secure them without abandoning democracy. The best we can possibly get is to train the people to interfere with judgment and discretion.

His second is, that competent health officers should be sufficiently paid, and that they should be retained in service during good behavior. As the custom now is a man is not justified in expending the time and money necessary to equip himself for the duties of a health officer.

The third is, that there be better facilities for the study of preventive medicine.

The author is definite in his opinion that the ordinary course in curative medicine taken by the physician does not qualify him for the duties of a health officer. Furthermore, the opinions of a practicing physician on methods of preventing disease are often worse than valueless. A physician cannot practice curative medicine and at the same time discharge his duties as a health officer with advantage either to the community or to himself. When it comes to stating just how the health officer shall be trained, the author is not so definite. I confess that I am hazy as to the details of the training that he should have. The course in public health

should not be founded on the degree of medicine. As to that I feel certain of the author's opinions.

It does not seem that he would have it be specialized over-much. He is against, for instance, limiting surgery to surgeons who have a special degree, telling of the discoveries by country surgeons who would have come under

the ban of such a requirement. He thinks highly of courses of instruction in law, sanitation, engineering and medicine, of health officers' schools and associations. Probably we have not reached the point where any one wants to say definitely and concretely just where and how the health officer shall be trained.

W. A. Evans, M. D.

The Control of Hunger in Health and Disease. By Anton Julius Carlson. Chicago University Press, 1916. Pp. 319. Price \$2.00.

This is a work of unusual interest. For several years the author has been privileged to make observations upon an intelligent subject who has a large gastric fistula. The opening was made long ago to permit feeding after closure of the esophagus. It is of a size to admit various recording instruments to the stomach. Doctor Carlson and his associates have supplemented their experiments upon this individual with many others upon themselves and on animals. The total mass of their results is impressive and testifies to their industry and ingenuity. Moreover, these results are assembled and discussed with excellent judgment.

The "hunger" of this treatise is an objective phenomenon, a strong, recurrent contraction of the empty stomach. It is the cause of a gnawing pang but can be recognized by the movements of a manometer as well as by its token in consciousness. Thus it can be studied in dogs and rabbits. This primitive hunger is distinct from appetite which is assumed to be essentially mental, compounded of recollections and anticipations. The hunger contractions are found to

have the following characteristics: They are more frequent and powerful in young than in older animals. They do not cease in long fasting though human experience shows that they are less and less vividly felt. They are aggravated in diabetes and kindred conditions. A variety of sensory stimuli, especially the tasting of food, may cause them to be inhibited. Acid introduced into the stomach suppresses them and this is a factor which operates when gastric juice flows at meal time. The nervous mechanisms concerned are localized in the stomach wall though inhibition of central origin is common.

There are many incidental observations. Among them we have the fact that the "empty" stomach usually contains an ounce or two of fluid. Its walls secrete gastric juice slowly but continuously during fasting. The secretion after feeding is surprisingly copious; the total daily volume may reach 1500 cc. The acidity may be higher than we have supposed, as high as 0.5 per cent. HCl.

P. G. Stiles.



THE DECEMBER JOURNAL.

SYMPOSIUM ON MENTAL HYGIENE.

Psychiatric Clinics in the Schools. Dr. J. T. MacCurdy, Consulting Psychiatrist, Institution for Feeble-Minded, Randall's Island.

The Relation of Alcohol and Syphilis to Mental Hygiene. Dr. Frankwood E. Williams, Secretary, Massachusetts Society for Mental Hygiene, Boston, Mass.

The Relation of Social and Economic Factors to Mental Hygiene. Dr. C. MacFie Campbell, Henry Phipps, Psychiatric Clinic, Johns Hopkins Hospital, Baltimore, Md.

A National Program of Education for Mental Hygiene. Dr. Thomas W. Salmon, Medical Director, National Committee for Mental Hygiene, New York City.

Health Department Reports and Notes.

REPORTS.

Jacksonville, Florida.

Among the many reports received by the JOURNAL during the year, there are a few which we wish could be made the standard for all others, and year after year among that few we can always recommend the report of the Jacksonville Department of Health, under the able supervision of Dr. C. E. Terry. Using his keen insight into public health conditions and applying his knowledge of the most modern means of combating disease, Doctor Terry has yearly reported the conditions of his city in a most effective manner, giving ample and excellent interpretations of the vital statistical data, and drawing his conclusions and setting forth his recommendations in a most convincing manner. In preparing this report for 1915, the similarity of the work of that year with the work of previous years was brought forcibly to his attention. It was evident that no better results could be accomplished under the existing organization of the health department since it had reached its maximum efficiency. As a consequence many radical changes are suggested. These will be considered in the recommendations.

During 1915 there occurred in this city of 73,137 population, 530 white and 824 colored deaths, a death-rate of 14.7 and 22.1 per 1,000 respectively, giving a general death-rate of 18.5 per 1,000. It will be noted how greatly in excess is the colored death-rate.

Smallpox returns showed the smallest number of cases on record, 151. It is considered that this is a direct result of the 1912 campaign against this disease, when 30,000 people were vaccinated.

151 cases of diphtheria were reported, with 16 deaths. It is of interest to note the great disparity between the cases reported for the white and colored races; the former gave 129 cases, while the latter gave only 22 cases, though the deaths were 8 each. This apparent racial difference to susceptibility to this disease is explained on several bases. Foremost is the racial apathy to the danger signals

of acute infections, resulting in the non-reporting of mild and moderate cases of all communicable diseases, allowing them to run their course without medical supervision. Another reason for the very incomplete case reports is the failure of many of the colored physicians to make use of the laboratory of the state board of health to assist them in diagnosis. The third reason listed is the absence of medical inspection among colored school children. An excellent discussion accompanies the section devoted to this disease, especially in connection with the resulting sixteen deaths. The short review of the fatal cases shows the factors which largely determine the mortality of diphtheria in any epidemic, chief of which is ignorance. Scarlet fever, measles, rabies, malaria, and whooping-cough seem well under control. The tuberculosis mortality-rate has remained practically stationary since 1911. In 1915 this disease was responsible for 158 deaths, 32 white and 126 colored. To lessen the number of deaths further from this disease, considerable increase in the nursing force is needed, also institutional care for cases of this disease, particularly among the colored population. There was a typhoid death-rate of 19.1 per 100,000, the lowest ever recorded in Jacksonville. Of the 92 cases reported, 58 originated in the city, which caused 8 of the 14 deaths. This sustained and spectacular reduction of the typhoid-rate during the last five years is attributed directly to the ordinance governing the construction and maintenance of privies, relating especially to fly-proofing. Pellagra is assuming an important position among the causes of death in this city. During 1915 it caused 51 deaths, giving a mortality-rate of 69.7 per 100,000. Prior to this year the highest rate had been 24.9 in 1912. Considerable difficulty is being experienced to install any control measures for this disease on account of the incomplete reports of cases and the fact that often the first the department learns of a case is through the death certificate.

Moreover, it is the opinion of the health officer that the problem is an economic rather than a health problem.

The infant mortality-rate was further reduced in 1915 to 82.9 per 1,000 births, the lowest yet recorded. This excellent record is attributed largely to the work of the Infant Welfare Society's nurse and the colored visiting nurse. Of material assistance also in this reduction was the midwifery ordinance, which necessitates the licensing of midwives, and furnishes them with elementary instruction in the performance of their duties. Such licensing subsequently diminished greatly the number of midwives practicing. Prior to the passage of this ordinance, the percentage of births attended by midwives was 51.7 for the period of five years. It has been reduced for the reported year to 40.6 per cent. A further gratifying sign of improvement in the methods of these women is the continued reduction of the number of deaths from the so-called "tetanus period" which are understood to be deaths occurring between the fifth and eighteenth days of life, which the department believes are in many cases attributable to tetanus neonatorum. It was mainly the great preponderance of deaths in this period of life of babies attended by midwives over those attended by physicians that caused the passage of the midwifery regulations. The chart accompanying this phase of the report clearly shows the effectiveness of the regulation. At present the midwives, aside from their instruction, are supplied with sterile umbilical dressings.

It is of interest to note in this report a short section devoted to habit forming drugs. After the passage of the Harrison Act, provisions were made, through private philanthropy, for the treatment of drug addicts unable to pay for such service, at one of the city hospitals. As a result 67 were so treated, outside of those treated in private institutions, and today it is believed that few narcotic users are in the city. In this connection two state laws have been passed of an extremely creditable nature. One is aimed at the physician careless in the distribution of opium derivatives and cocaine, and the other provides treatment at the state insane hospitals for indigent addicts.

We have already referred to the proposed partial reorganization of the department, since the present arrangement is incapable to cope

with various problems of public health administration in accordance with the most modern methods. To quote the report:

"As our knowledge of factors, both direct and contributory, in morbidity from communicable causes increases, it is daily more apparent that preventive measures, to be effective, must follow lines different from heretofore. As new avenues of infection are recognized, new barriers must be erected; contact rather than air or fomites has, during the last decade, come to be recognized as the one most common mode of disease transference. To meet it we must abandon the pest house idea and backyard cleanliness and concern ourselves with the family kitchen and the habits of each member of the household; food infection calls for modern laboratory equipment; the various insect-borne diseases for a revision of our building laws and, interwoven with each of these gross sources of danger, is the individual himself, his habits and modes of life, his care and carelessness, his responsibility as a unit, safe or dangerous to community welfare. Second only to the havoc his ignorance may play with others, is its danger to himself,—to be safe he must be immunized with knowledge, he must learn about contact and cleanliness, about filth and disease, he must be constituted an integral part of our armamentarium rather than an obstacle to our sanitary progress.

"This problem of the individual and his close bearing on community health requires special methods of approach—it means that we must cross the home threshold and mingle, more or less intimately, in the life of the family; from oldest member to the youngest child must a protecting watchfulness be exercised and, further even than this perhaps, shall our most valuable efforts be directed at the generation yet unborn."

The chief change suggested is the substitution of six sanitary inspectors, whose training does not prepare them in any way to undertake this new work, for six nurses, whose training as well as sex will enable them to become intimate with the mothers and children of the household, and also will make it possible for the city to extend its welfare work to every section of the city. As it is now the sanitary inspection department spends in salary some \$19,400 for the prevention of some 34 deaths; while the nursing department of one third the above staff, and with the expend-

iture of only \$8,300 has direct connection with the prevention of some 307 deaths a year. It is also desired to increase the number of colored visiting nurses. This year only one was employed, and the results she accomplished were remarkable. Such an increase in the staff would be a material factor in reducing the enormous colored death-rates, which seems to be characteristic of all southern cities.

Doctor Terry also recommends strongly the early passage of laws governing the production of dairy and creamery products other than milk, of bread stuffs, bottled waters and soft drinks; of one dealing with the construction and maintenance of abattoirs and the inspection of food animals locally slaughtered, and of more importance, in view of the climatic conditions, of suitable laws regulating the construction and

maintenance of stables with special reference to the eliminating of rat- and fly-breeding places.

The various subreports speak equally well of this department's activity and excellent results. It is of especial importance to note the growth of the laboratory under the direction of Dr. W. G. McKay. Obviously all departments have contributed to make this report so creditable. The discussion of the records and results are put forth in a clear and concise manner, and the small special tables and graphs are particularly of value. The per capita expenditure is approximately fifty-three cents for health work. In conclusion we can most heartily endorse this report, not only for the general excellency of the presentation of its health conditions, but, too, for lucid and keen deductions of health matters as put forth by the chief health officer.

Winnipeg, Manitoba.

This northern city reports the extremely low death-rate of 8.73 per 1,000 population, based on a population of 201,981, the lowest death-rate on Winnipeg's record. It is the belief, however, that the death-rate is actually higher than this, for it may be that the estimated population is too high, and it is obvious that, due to the unstable conditions existing in the city, an accurate estimate of the population can not well be made. Notwithstanding this doubt, however, the death-rate is very favorable.

The Department of Health also reports another record broken. The infant mortality rate per 1,000 reported births is 106.3, in comparison with the 1914 rate of 125.9. Doctor Douglas, the medical officer of health, is extremely gratified with this showing, and believes that the true rate is even lower, since he feels perfectly certain that many births have not been reported. It seems that notifications of birth are not made to the Health Department, but a rearrangement is being made of the Vital Statistics Act, which promises to make it possible to have adequate registration carried out. Much credit for this reduction in the infant death-rate is extended to the Babies' Milk Depot and other agencies, which carried out their work with a high degree of efficiency.

One hundred and fifteen cases of typhoid were reported during the year, of which seven died,

giving a death-rate of 3.5 per 100,000, against a rate of 7.9 in 1914. Sixty-one of these cases originated outside, resulting in two deaths, thus giving a corrected death-rate of 2 per 100,000. No group of cases was traceable to infected water or milk throughout the year. Sixteen cases of smallpox were reported, eight of which were imported from the outside, in comparison with 108 of the previous year. Both morbidity and mortality rates from measles, scarlet fever, whooping-cough, and diphtheria showed in most cases marked reduction from the records of 1914, though it is the opinion of the department that the rates are still much too high, especially in the case of diphtheria, cases of which numbered 463 with 44 deaths. It is interesting to note that in respect to whooping-cough, Doctor Mathers of the King George Hospital reports that of a group of nine patients receiving vaccine, all were entirely free from cough on an average of fifteen days from commencement of treatment. Two had completely recovered in seven days. "It is altogether probable," states this report, "that it is owing to the employment of this treatment that we can point this year to the second lowest rate we have recorded." This is of particular importance when we consider that during the last two years considerable experimentation has been carried on as to the applicability of serum therapy to this disease.

Tuberculosis showed a gain during the year. In 1915 deaths from tuberculosis in all forms aggregated 194, a death-rate of 96 per 100,000. In 1914 the death-rate was 92.5. Though the increase is not very great, it is the opinion of the health officer, that it is "sufficient food for thought." Among the proposals to combat this disease are suggested the appointment of another nurse, the establishment of a night clinic, the pasteurization of the total milk supply, and better notification and further coöperation and help on the part of the physicians and public.

During the year much creditable legislation has been enacted, both for the Province of Manitoba and the city of Winnipeg. These laws deal with sanitation and inspection of lodging houses and hotels, and of portions of buildings below the street level, the ventilation and lighting of all dwelling places, the licensing

of milk vendors by the Food and Dairy Inspector, rather than by the License Department, and the prohibiting of bottling of any milk or cream on any premises not licensed for that purpose.

Space does not permit us to review in detail the excellent subdivisions of this report. It is obvious, however, that their work has been carried out with great thoroughness and ability, as evidenced by the general reduction of morbidity and mortality rates, and by the spirit of progress and energy displayed throughout this report. Winnipeg expends a total net health department expenditure per capita of 91.4 cents. The results of this comparatively liberal per capita expense are obvious. It is a lamentable fact that many cities of the United States are striving for better health conditions on a per capita expenditure of hardly half of that of Winnipeg.

NOTES.

Profiting by Experience with Infantile Paralysis.—Now that the greatest outbreak of infantile paralysis in history is on the wane, most health departments, through their weekly and monthly bulletins, are commenting on their experiences with the epidemic and the benefits derived from such experiences. Of particular merit is the comment made by the New Jersey State Health Department in its September *Public Health News*.

This Department believes that the gains from the poliomyelitis epidemic relate more to other diseases than to poliomyelitis itself, especially to general problems of public health administration. Some of these gains are as follows:

1. The general awakening to the necessity for public health work. It is true that the public has seldom been so aroused over an outbreak of disease as over the recent outbreak of paralysis. Such an awakening will undoubtedly result in a demand for better public health work, and consequently it will bring about a willingness on the part of the public to provide the facilities for such work. The Bulletin believes that this one gain should soon more than compensate for this year's loss from the epidemic.

2. Hospitalization of all cases of communicable disease. Focussing of public attention

upon this important means of preventing the spread of communicable disease should lead to a much further development of the hospital treatment of such diseases, a thing which has been approved and recommended by health authorities for many years.

3. Local health boards in rural communities, mere paper organizations. This Department believes that the outbreak of poliomyelitis has demonstrated to the public the utter worthlessness of many of the boards of health in the townships and rural communities, and even in some boroughs and towns.

4. Local units of health administration too small. It is believed that the majority of these units are so small that sufficient funds cannot be provided for adequate public health work by a reasonable rate of taxation, the result being that the health work is left undone.

5. Necessity for specially trained full-time local health officials. It is obvious that the untrained man has frequently been tried in health work and found wanting, because the health protective measures of today are so diversified and so specialized that few without special training can carry them out.

6. Concentration of health activities. Only by the concentration of all public health activi-

ties of a community in one man can effective work be secured.

7. Uniform regulations throughout the state. The inconvenience, annoyance and resulting inefficiency due to the enforcement of different regulations in each sanitary district has been forcibly impressed upon the public during the recent outbreak.

8. State sanitary supervisors. New York, Massachusetts, and other progressive states have such supervisors. New Jersey wishes to follow their lead, realizing the benefit to be derived from the assistance to rural boards of health which these men can furnish.

9. Special emergency appropriation. Obviously, to fight disease it is necessary that ample funds be made available for any special outbreak which may arise.

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Public Bathing and Infection.—Recently, in Chicago, there occurred a death from infection resulting, as reported, from exposure in lake bathing. There have also been reported a number of cases of serious sickness of a similar nature during the past summer months. The Chicago Health Department, in its weekly bulletin of October 7, comments to some length on this subject, as follows:

"That the water at the beaches may be especially unclean at certain times, when there is little wind and the lake currents are not strong, may be easily imagined when many thousands of bathers are in the water. That the individuals who frequent the bathing beaches may add many elements of contamination to the common bath is fair to say.

"It follows that if the water thus contaminated by tens of thousands of human bodies gains entrance into the nose, ears, eyes and throats of bathers, or is swallowed by them or aspirated into their bronchial tubes, infection may follow, particularly if the physical resistance of the bathers is lowered, favoring infection.

"It is not surprising then that many cases of ear trouble or inflammation of the eye or nose or sore throats have occurred. Physicians have had many cases to treat this summer.

"Where the sickness takes the form of bronchitis or pneumonia, it may be due to extension of the infection from the nose or throat, or because water has been drawn into the lower tubes.

"Infection may also occur on the external

skin, in the form of boils, when the natural protective oil of the skin has been removed by prolonged soaking in the water, by friction, or when the skin has been injured by the sun.

"It follows that proper care should be taken by those who patronize the bathing beaches and various swimming pools and public bathing places."

To those who frequent natatoria and bathing pools during the winter months as well as to those who are to use the outdoor pools and beaches next summer, the following rules are advocated by the Department:

Never take the water in your mouth.

Never swallow such water.

Avoid drawing water through the lower breathing tubes.

A little vaseline in the external ears and nostrils will help to prevent infection.

Do not stay in the water too long.

Do not open your eyes when diving under water.

If evidence of infection occurs on the skin, in the ears or eyes, nose or throat, see your physician promptly.

✱

The Low Infant Death-Rate of New York City so far this Year.—The first thirty-seven weeks of 1916 have shown interesting and gratifying reports in connection with the activities of the Department of Health and the allied agencies in reducing the infant mortality rate of that city.

According to the weekly health bulletin:

From January 1 to September 23, 1916, there have been 942 fewer deaths under one year of age than there were for the corresponding period of 1915. This reduction has been distributed throughout the year, but the past fourteen weeks hold particular interest, inasmuch as during that period the city has been suffering from an extensive outbreak of poliomyelitis.

As 10 per cent. of the total number of cases of poliomyelitis occur in babies under one year of age, it might reasonably be expected that this increase in the death-rate from this disease might show an effect in an increase in the total infant death-rate. However, such has not been the case.

For the fourteen weeks beginning June 24 and ending September 23, including the period when the outbreak of poliomyelitis has been most

active, there have been 385 fewer deaths of babies under one year of age for the City of New York than there were during the corresponding fourteen weeks of 1915. This gain is due to the marked reduction which has been shown in the deaths from gastro-intestinal disorders, as there have been 624 fewer deaths from gastro-intestinal diseases, in infants under one year, during the fourteen weeks above mentioned than there were for the corresponding period of 1915.

This marked decrease in deaths is significant in that it would seem to show better care given to babies in general, on account of the anxiety of mothers because of the poliomyelitis epidemic. It is possible that there has been a certain amount of error in the diagnosis of cases of poliomyelitis and that some cases of gastro-enteritis resulting in death have been diagnosed as due to poliomyelitis. It is believed, however, that the margin of error is very small, as all deaths where the diagnosis was not clearly evident have been carefully investigated by the department, and errors have been eliminated before making up the final figures.

The work of the Bureau of Child Hygiene during this period has been greatly increased, inasmuch as many mothers have been afraid to bring their babies to the Department's Baby Health Stations. This, of course, has involved more continuous and widespread home visiting on the part of the nurses of the bureau.

✱

California Attacks a New Problem.—Believing that mental diseases, as well as the more common infectious diseases, should come under the administration, at least surveillance, of the health department, the California State Board of Health has a committee which is investigating the present method by which the insane and drug habitues are "arrested, incarcerated, examined, and committed to state institutions."

From the preliminary report of the committee, according to the September monthly bulletin of the State Health Department, it is apparent that:

"The prevention of insanity and drug habits would be materially advanced by adequate study of mental and drug cases by experts before commitment. Under the present system many patients are never seen by a competent alienist until after they have been legally committed to an insane hospital. The average physician is

no more able to diagnose mental disease accurately and pass on the need for commitment than he is able to practice that other important specialty—public health. Both involve responsibility which cannot be met without special training and extensive experience. Mental disease and addiction to drugs, including alcohol, add greatly to the sum of human misery. The state needs psychopathic hospitals where the cases can be studied to determine the need for commitment, the type of institution to which the patient should be sent, and the possibility of avoiding formal commitment by a prompt cure at the observation hospital. Such study would greatly further the prevention of dependency from mental disease."

✱

The Public Health Council of Buffalo.—Health Commissioner Fronczak has appointed a number of physicians and laymen to assist him in an advisory capacity in all important matters of health and sanitation, and to be known as the Public Health Council. The principal questions for this committee to consider will be such as involve a radical change of procedure from established practice. The commissioner feels that after an impartial body of men and women residents of Buffalo have placed their stamp of approval upon such measures, the public will be better satisfied and the Commissioner cannot be accused of being either too severe or too lenient.

Commissioner Fronczak is extremely gratified with the hearty coöperation already given him by this committee at its first meeting in the mayor's office. Each member present indicated by voice or action his or her approval of the plan, as outlined by the Commissioner.

It is the intention not to impose upon the time of these very busy people. They will be sent, in advance, an epitome or brief outline of whatever is to be presented at each meeting, so that they may come prepared to act. In this manner each session ought not to last more than half an hour, will be called only when necessary, and will begin promptly on time.

At the first session the time was taken up in outlining the work of the committee and hearing the opinions thereon by those present. The next meeting will begin with the actual work.—*Buffalo Sanitary Bulletin.*

A Simple Method of Pasteurizing a One-Quart Bottle of Milk.—In the September *Health News*, the monthly health Bulletin of the New York State Department of Health, Miss Ruth Vories, Laboratory Assistant of the Division of Laboratories and Research, describes a series of experiments planned to determine a simple method of pasteurizing a one-quart bottle of milk, "a method which would insure pasteurization yet be practical for every housewife to carry on in her own kitchen with ordinary utensils."

The following plan, inasmuch as the maximum temperature was not as high as to injure the milk and since the temperature in this milk was held at 60 degrees C. for over thirty minutes, assures thorough pasteurization without undesirable changes.

1. Boiling $2\frac{1}{2}$ quarts of water in a large agate saucepan, or better

2. Boiling 2 quarts of water in a 10-pound tin lard pail, placing the slightly warmed bottle from ice chest in it, covering with a cloth and setting in a warm place. At the end of one hour the bottle of milk should be removed and chilled promptly. *The water must be boiled in the container in which the pasteurization is to be done.*

✱

Exploiters of Fraudulent Cures Prosecuted.—The New York City Department of Health has succeeded in obtaining jail sentence and substantial fines as penalties for two charlatans who attempted to exploit fraudulent cures for poliomyelitis in that city.

We quote from the weekly bulletin of the New York City Department of Health the history of the two cases:

"The story of the case of Mr. Frooks is as follows: Frooks manufactured and sold a kind of amulet to be worn around the neck to protect the wearer from infantile paralysis and other diseases. Analysis by the Department of Health Laboratory showed that the amulet consisted of a cotton bag containing cedar wood shavings. Frooks was successfully prosecuted for representing that the wearing of this bag would protect the wearer from infantile paralysis. In finding him guilty and pronouncing sentence, the Court expressed its condemnation of the vicious and cruel exploitation of the public. Frooks was condemned to spend thirty days in jail and to pay a fine of \$250.

"The story of the case of Manchester is as follows: A preparation called 'Sol,' manufactured and sold by the defendant, James T. Manchester, was represented as being a cure for infantile paralysis, consumption, rheumatism, and other ailments. This preparation, on analysis, was found to consist essentially of capsicin, sassafras and alcohol. In view of the vicious type of violation of the law, the magistrate sentenced the defendant to thirty days in jail.

✱

Some Community Measurements.—We are indebted to the monthly bulletin of the Indiana State Board of Health for the following unusual statements:

"Dyspepsia. The amount of dyspepsia in any community is in direct proportion to the hasty eating of improperly cooked foods, by the average citizen.

"Diphtheria. The mortality from diphtheria in any community is in direct proportion to the failures to early administer antitoxin, by the average citizen.

"Syphilis. The amount of syphilis in any community is in direct proportion to the amount of illicit commerce, by the average citizen.

"Gonorrhœa. The amount of gonorrhœa in any community is in direct proportion to the amount of wild oats sowed by the average citizen.

"Insanity. The amount of insanity in any community is in direct proportion to the amount of syphilis and alcoholism of the average citizen.

"Bad Breath. The amount of bad breath in any community is in direct proportion to the decayed teeth and intestinal indigestion of the average citizen.

"Typhoid. The amount to typhoid fever in any community is in direct proportion to the quantity of human excrement consumed by the average citizen.

"Tuberculosis. The amount of tuberculosis in any community is in direct proportion to the quantity of foul air consumed by the average citizen.

"Infantile Mortality. The amount of cholera infantum and infantile diarrhœa in any community is in direct proportion to the amount of food poisons consumed by the average infant.

"Smallpox. The amount of smallpox in any community is in direct proportion to the neglect of the average citizen to be successfully vaccinated.

"Arteriosclerosis. The amount of arteriosclerosis in any community is in direct proportion to the amount of auto-intoxication acquired by the average citizen."

✱

The Teachers' Institute.—During the two weeks postponement of the opening of school in New York City, teachers' institutes were held throughout that city. This naturally afforded a splendid opportunity for representatives of the health department to meet the teachers and impress on them the importance of health instruction to school children, and to point out ways in which such instructions could be effectively applied.

According to the weekly bulletin of the city health department:

"Special emphasis has been laid on the new syllabus on hygiene prepared for the use of school teachers by the Bureau of Educational Hygiene of the Department of Education. In planning the work, the object has been to keep in mind practical affairs of daily life, such as keeping scalp and hair clean, brushing the teeth, attending to clothing, study, play and rest. Each topic is thus related to daily living. The instruction is tested by inspection and by questioning the pupils as to their success in putting into practice the teaching of previous lessons. Such instruction will interest the pupils in the formation of good hygiene habits and will result in application of the lessons of personal hygiene to the home, neighborhood, school and city.

"The consideration of any special topic is not necessarily limited to any special time. While all the topics given in the lessons are adequately covered during the term, principals are empowered to make appropriate adjustments to the neighborhood needs.

"Every morning 800,000 pupils will be given their daily hygiene inspection. In some schools this will be very formal and military. In others it will be very much like the looking-over careful mothers give their children when they get them ready for school. Cleanliness is to become a habit in which the children will take a personal pride. Class records may be kept on charts hung up in the classroom for everyone to see. This will be adapted by the principal of each school to the special needs of his children."

If the course of instruction outlined in the

syllabus is followed, the school children of this city should soon become one of the most powerful factors promoting the health of the community.

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1917 Budget of New York City Department of Health for Health of School Children.—The 1917 budget estimate of the Bureau of Child Hygiene of the New York City Health Department calls for \$75,240 more than last year for school health work. The additional money is needed for enlarging the staff of medical inspectors and nurses so as to reduce the present proportion in the number of children to physician and nurse to a better working basis. Six dental hygienists are also asked for who are to be engaged in prophylactic work and giving surface treatment, thereby adding considerably to the preventive as well as curative services at present available in the schools and clinics. The following table shows the present and proposed staffs:

	1916.	1917.	Increase.
Medicial Inspectors.....	100	125	25
School Nurses.....	200	252	52
Dental Hygienists.....		6	6

The 1915 reports on medical inspection show that out of over 925,000 pupils enrolled in the public and parochial schools, only 305,665 or 33 per cent. were examined for physical defects, leaving a large percentage among the two thirds of the enrolled children not examined possibly suffering from various physical defects, which in their very nature are a handicap to school progress. Of the children examined, 222,072 or 72.6 per cent. had physical defects requiring treatment as follows: defective vision, 14.5 per cent.; defective nasal breathing, 9.5 per cent.; hypertrophied tonsils, 11.2 per cent.; defective nutrition, 5.3 per cent.; defective teeth, 63.9 per cent.; and to a lesser extent there were cases of cardiac and pulmonary diseases, defective hearing and orthopedic defects.

The large number to be examined and the small staff of physicians available made it impossible at times to give each child a complete physical examination, with the result that 129,125 or 42.2 per cent. of the children examined did not have their vision tested.

The large percentage of untermiated cases under treatment or investigation proves the insufficiency of the staff employed for this vast

and important task. As much of the curative work done by private physicians or at clinics is due largely to the follow-up efforts of the school nurses, this phase of the health supervision cannot be conducted as effectively as desired unless an adequate staff of nurses is provided.

Both these handicaps in the results of the year's work are due to the large number of pupils assigned to each physician and nurse, being respectively 9,200 and 4,800, whereas the ratios should never exceed 3,000 in either case. The appointment of the additional physicians and nurses asked for will reduce but slightly this ratio.

Ratio of Pupils to Physicians and Nurses.

	1916.	1917.
Pupils to physician.....	9,200	7,400
Pupils to nurse.....	4,800	3,666

Public safety demands the quick recognition and exclusion from school of all cases of infectious disease. The health and efficiency of each individual child demand the discovery of any physical defects which may have a deleterious effect, not only on his well-being but also on his educational progress. Without the proper number of physicians and nurses indicated above, it is believed that neither of these important requisites can be observed.



Campaign Against Lake Pollution Yielding Results.—The constant and persistent efforts made to preserve the purity of Chicago's water supply are yielding results. Figures just compiled in the Department of Health show that the typhoid rate of the city during the first eight months of this year is 6.2 deaths per every 100,000 inhabitants. Last year the typhoid rate was the lowest in the history of the city.

A summary of the samples of water taken from the various pumping stations supplying the city, analyzed during the first eight months of this year, indicates that only 0.28 per cent. of the samples showed distinct evidences of pollution,—that is, colon bacilli in 1 cc. of water.

Continuous improvement in the water supply

is shown in the following table prepared by the Director of the Laboratory:

Year.	Per cent. of samples containing colon bacilli in 1 cc.
1911.....	18.1
1912.....	11.3
1913.....	5.3
1914.....	4.5
1915.....	2.7
1916 (1st 8 months).....	0.28

The material improvement since 1912 is, for the most part, attributed to the hypochlorite and chlorine treatment recently inaugurated.



School of Civics and Philanthropy.—The Department of Public Welfare of the City Government of Dallas, Texas, in collaboration with the United Charities of that city, have recently organized a school of Civics and Philanthropy. This school includes a division of Health Protection for which the Director of the Department of Public Health, Mr. Charles Saville, has arranged a series of twenty-five lectures. This series of lectures embrace the following ten main topics: I. Health Education; II. Communicable Diseases; III. Non-Communicable Diseases; IV. Milk, Food, Water and Air Supplies; V. Wastes Disposal; VI. Soil Pollution; VII. Housing; VIII. General Sanitation; IX. Indigent Sick; X. Administration of Public Health Work.



Pertussis Vaccine.—On October 1 the New York City Health Department's whooping-cough clinic was discontinued. This clinic was established more than two years ago for the purpose—now completed—of gathering data on the therapeutic value of a specific vaccine for whooping-cough. While the results will not be published in full for some time, it is stated that the vaccine has a distinct field of usefulness, and that its use should be encouraged.

New York physicians wishing to use the Health Department's Pertussis Vaccine may obtain it, gratis, on condition that they make a full report of their cases to the Department. Printed directions are given out with the vaccine.

Public Health Notes.

Should Terminal Disinfection Be Abolished?—

Under this caption, an exceedingly interesting symposium is presented in the September number of the *Medical Times* by the following well-known sanitarians: R. H. Creel, Assistant surgeon-general, U. S. P. H. S.; Linsley R. Williams, M. D., deputy commissioner, New York State Health Department; H. W. Hill, M. B., M. D., D. P. H., director, Institute of Public Health, London, Canada; Charles S. Caverly, M. D., President, Vermont State Board of Health; John Dill Robertson, M. D., commissioner of Health, Chicago; Joseph S. Neff, M. D., Philadelphia.

Owing to the pressure of the infant paralysis epidemic, the officials of the New York City Health Department did not prepare a paper, but sent as their contribution the data issued at the time terminal fumigation was discontinued.

In reply to the question, New York City, Creel, and Hill vote "Yes," and consume seven columns of space in explaining their views. Caverly, Robertson and Neff say "No," and find one column of space sufficient.

Turning to the reasons given by the affirmative, we find the following:

1. New York City and other cities have proven that the discontinuance of terminal fumigation was not followed by an appreciable increase of "after cases";

2. The frailty of the microorganisms of scarlet fever, measles, and diphtheria is such that their existence outside of the human body is very brief;

3. The penetration of gaseous disinfectants is not high enough to disinfect except on surfaces;

4. Thorough disinfection by means of solutions is practically impossible; amounts as at present used are inadequate;

5. Concurrent disinfection is better;

6. Members of the infected household have, by the time the patient has recovered, demonstrated their immunity, and later visitors have practically no contact;

7. The necessity for the practice has not been justified with bacteriological studies;

8. Such epidemics as have been traced accurately have almost invariably been traced

to milk, or to contact, and not to inanimate objects;

9. The money spent for terminal disinfection is needed for other measures whose usefulness has been definitely established.

Of the anti-abolitionists, the most positive stand is taken by Dr. Robertson, who says that "until the bacteriologists determine that pathogenic germs have no life history worthy of attention outside of their hosts, I will favor terminal disinfection in cases of contagious disease."

The statement of Dr. Neff is given in full:

"Notwithstanding terminal disinfection is useless in some communicable diseases, and much is unnecessarily done, yet to abolish it is absolutely out of the question. It might be discontinued in such diseases as diphtheria, measles, etc., but should be continued in tuberculosis, smallpox and some other diseases, the means of transmission of which we know little about."

Dr. Caverly, while admitting that perhaps too much stress has been laid upon this phase of preventive medicine, feels that we are in danger of going to the other extreme in abolishing terminal disinfection entirely. He continues: "After certain diseases—chief of which are tuberculosis, diphtheria and scarlet fever—I should certainly hesitate to advise that terminal disinfection be omitted."

It is important to note that both Robertson and Caverly concede the advisability of substituting bed-side disinfection and scrubbing of horizontal surfaces for terminal disinfection.

The decision of the Department of Health of New York City is based on experimental evidence. We read in the statement as follows:

"The discontinuance of fumigation on October 8, 1914, in the boroughs of The Bronx, Queens and Richmond, as a routine method of disinfection after the major acute infectious diseases was not followed by any increased prevalence of diphtheria, scarlet fever or measles. On January 1, 1915, such fumigation was also discontinued in the Borough of Manhattan, but continued in the Borough of Brooklyn for purposes of control, and in order to test the efficiency and value of fumigation.

"It should be understood that in discontinuing fumigation the Department of Health has laid increased stress upon other and more efficient methods of disinfection, viz., thorough cleaning, fresh air and sunlight, and particularly renovation (*i. e.*, repainting and repapering) when necessary. Prior to the discontinuance of fumigation, no such renovations were enforced in any of the infectious diseases except tuberculosis. During the first five months of 1915, 10,785 such renovations, in addition to those for tuberculosis, were ordered and carried out.

"That the Department of Health was justified in its action is shown by the figures. There has been no increase in the prevalence of the various diseases; better and more efficient disinfection has been performed and the saving to the city has been at the rate of about \$30,000 a year.

"A table showing the number of later cases of diphtheria and scarlet fever occurring in the City of New York during the first five months of the year 1915 is attached. . . . It will be at once noted that terminal fumigation in cases of diphtheria and scarlet fever in the Borough of Brooklyn has not resulted in a decreased prevalence of those diseases as compared with other boroughs.

"In the Borough of Manhattan 193 later cases occurred among 3,451 primary cases of diphtheria (5.6 per cent.). Of these 171, or 4.9 per cent. would not have been affected by fumigation, and 22, or 0.6 per cent. might have been so affected.

"In Brooklyn, where fumigation was performed, there was 138 later cases among 2,907 original cases (4.7 per cent.). Of these, 110, or 3.8 per cent., would not have been affected by fumigation, and 28, or 0.9 per cent., might have been so affected. In other words, there were half again as many later cases in Brooklyn, where fumigation was done, as in Manhattan, where it was not done.

"In the case of scarlet fever the number of possibly preventable later cases was practically the same in the two boroughs, viz., 1.0 per cent. and .99 per cent. respectively."

"These figures," the article concludes, "show that the discontinuance of fumigation in diphtheria and scarlet fever in the boroughs of Manhattan, The Bronx and Richmond has not been followed by any harmful effects. Terminal fumigation in infectious diseases will, therefore,

be discontinued at once in the Borough of Brooklyn."

Dr. Creel of the Public Health Service, from whose paper most of the reasons tabulated in the early part of this are taken, points out that "the practice of terminal disinfection has been discarded in proportion to our increasing knowledge of epidemiology. The past employment of disinfection in many instances was empirical." He demands, therefore, that terminal disinfection either give a sound *raison d'être* or go to the scrap-heap, along with other time-honored practices.

A possible exception is made by Dr. Creel in the treatment of foci of insect-borne diseases. He says that:

"Efficient fumigation by cyanide gas or sulphur fumes is worth while in destroying infected insects; but even in these diseases (plague, typhus, yellow fever, etc.) disinfection can only be considered as an auxiliary measure in effecting ingeneration."

Dr. Williams makes the important distinction that "disinfection implies the destruction of the infecting agent, and fumigation, the making of a smoke and it has been unfortunately assumed that the production of other gases of unknown disinfecting value was the production of a disinfectant."

Too much stress cannot be placed upon the fact that the opposition of the "abolitionists" is not directed against disinfection, but only against terminal disinfection. In the words of Dr. Williams:

"Such definite information points to the one logical conclusion, that is, that disinfection, to be effective, must be immediate and should aim at the particular known secretion or excretion which contains the infective agent and terminal disinfection, though possibly of some value in isolated instances, should not be relied on as a safeguard whilst terminal fumigation is usually improperly performed and valueless; but no doubt by the variety of evil smells generated gives a false sense of security to those for whose benefit it was performed."

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Poliomyelitis on the Decline in New York.—In the October 13 issue of *Public Health Reports*, C. H. Lavinder, surgeon, U. S. P. H., points out that infant paralysis in New York and the surrounding territory is on the decline.

Statistics are cited showing a decline of cases reported in New York City from 477 for the week ended September 2, to 144 for the week ended September 30. The maximum number of cases was reported during the week of August 12, when 1,210 case returns were made.

"It would seem likely," the article states, "that by or before the middle of November poliomyelitis in New York City will have reached about its normal endemic prevalence."

The case fatality has continued high, being well in excess of 25 per cent. for September.

The nearby states are also showing a decline in case incidence, all having passed the crest of the epidemic some time ago, with the exception of Massachusetts.

Finally, it may be added that reports show quite a *general prevalence of poliomyelitis throughout the United States*. Besides the epidemic in New York City and its surroundings, there seems to be, generally speaking, no large prevalence of the disease except in two states, *Minnesota and Illinois*, both of which have reported several hundred cases. So far as I can learn, the epidemics in these two states show the characteristics of the old type of poliomyelitis—that is, comparatively few cases widely scattered, with a low mortality. This is in striking contrast to the characteristics of the epidemic as it is occurring in New York City and the surrounding states.



Regulation of Venereal Disease.—"The western hemisphere," says the *Boston Medical and Surgical Journal* in its October 10, 1916, issue, "seems determined to be more progressive than the eastern, even if a colony has to display at the expense of the Mother Country."

Reference is made to recently enacted legislation in Australia directed against venereal disease. To quote the Boston journal:

"It is extremely drastic in its provisions. It provides that no one except a doctor shall attend such cases, penalty \$250; a person knowing or suspecting that he has such a disease shall put himself under medical treatment, penalty \$100; physicians must report such cases, penalty \$25; they must also report failure of the patient to attend for six weeks, give written warning to the patient of the danger of the disease, with special cautions against marrying, penalty of non-observance of each of these rules, \$25; par-

ents of children under sixteen must answer for them, penalty, \$50. Furthermore, should the commissioners of public health receive the information that any one is suffering from venereal disease he must require that person to furnish a certificate from a physician that it is, or is not, true; if for any reason he feels dissatisfied with this certificate he may require a health officer or two private doctors to examine the suspect. The health commissioner is also authorized to arrest and detain any person suffering from venereal disease for two weeks if he thinks that there is danger of infection, and any person knowingly infecting another is fined \$250.

"Provision is made that all proceedings under this act shall be secret, and any newspaper publishing an account of such proceedings shall be fined \$500 for the first offense, \$2,500 for the second. The law, furthermore, forbids advertising of medicine, instruments, or appliances for venereal disease, impotence, female irregularities, etc. No printed matter in regard to such devices is allowed to be distributed in any way. Any breach of confidence by an administrator of the act may be punished by a fine of \$500.

"To aid in educating the public in this matter, the government has issued a pamphlet dealing with sexual matters. This is written in a plain, non-technical style, the important passages are printed in red ink, and the common names of organs and diseases are used, besides their scientific ones, in order that there may be no misunderstandings. The ways in which these diseases may be contracted, the danger of infecting others, the horrible ultimate effects possible, and the precautions to be taken are all described clearly and forcefully. The importance of skilled treatment is emphasized, but no hint of the treatment is given—quite properly. Some of the most prevalent fallacies about sexual matters are mentioned and dispelled. This book must be handed by every physician to his venereal patients and it is also distributed in other ways, notably to the soldiers in camp.

"This campaign against venereal diseases has the merit of enthusiasm, justice and vigor. The act in question is, perhaps, a little too rigorous in parts and in other parts leaves some loophole for evasion, but time will round off the rough edges. We hope that the Australian people will be ready for this legislation; otherwise, of course, it will soon become a dead-letter. The

spirit in which it was conceived, however, is admirable, and coming generations will reap the benefit."

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Rocky Mountain Spotted Fever in California.—In *Public Health Reports* for October 6, 1916, Dr. Frank L. Kelly, assistant epidemiologist of the Bureau of Communicable Diseases of the California State Board of Health, reports an investigation in Modoc and Lassen Counties, Cal., in May, 1916, to determine the prevalence and geographic distribution of Rocky Mountain spotted fever in those counties.

His report, which was made to the director of the Bureau of Communicable Diseases of the California State Board of Health, shows that he had reports of thirty-eight cases, six in Modoc County and thirty-two in Lassen County. The following table, the figures of which are taken from his report, shows the number of cases and the mortality by years:

Year.	Modoc County.		Lassen County.	
	Cases.	Deaths.	Cases.	Deaths.
1903.....	1			
1904.....	1	1		
1908.....			1	1
1909.....	1		2	
1911.....			3	1
1912.....	1		3	1
1913.....			2	
1914.....			2	
1915.....			11	2
1916 ¹	2		8	
Total...	6	1	32	5

¹ The figures for 1916 are not complete.

His conclusions are as follows:

1. Rocky Mountain spotted fever has existed in California for a much longer period and to a far greater extent than has hitherto been supposed.

2. There are probably five main infected areas, one in Modoc County and four in Lassen.

3. The disease is not as severe in California as in Montana, nor as light as in Idaho.

4. The infection probably entered California through Nevada rather than Oregon.

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Crippling the Sanitary Inspector.—"The enforcement of the law requiring sewer connections, the fly proofing of privies, which for any reason may not be connected to the sewer, the elimination of shallow wells, the prevention of the accumulation of manure, the enforcement of the regulation requiring that all premises be furnished with a garbage tin and the enforcement of a housing code are the important duties of a sanitary inspector. Successful work along these lines alone would go far to improve the public health.

"It is to be regretted that the inspectors cannot devote their entire time to such duties. This, however, is impracticable because the average citizen has a false conception of the duties of a health department. He believes that pestilence arises from the collection of ashes or old bottles in the adjoining lot, sewer gas, a dead dog in the street, the neighbor's chicken yard, bad odors and the like, and therefore everything that offends the special senses is reported to the health officer as dangerous to health. It is in attending to such matters that the sanitary police are required to perform a great deal of work which has little or no bearing on the public health, and which is a reason why many health departments are devoting a greater part of their energies and appropriations to things that count for little or nothing in the prevention of disease and are unable to perform those duties which are of real importance. This unfortunate condition must be attributed largely to the various health departments, which have neglected to educate the people along the lines of modern thought in public health work. Many health departments of the present day are still using antiquated methods, and so long as the people think that everything unsightly must necessarily be insanitary, health departments are compelled to expend the bulk of their money in performing duties that do not concern the public health. Thus it is difficult to secure funds to make much-needed reforms.

"Many of the complaints that now come to the health department should be made to the police department, and it should be the duty of that department to have such nuisances abated. In

fact the modern view contemplates that each patrolman act as a sanitary inspector. This has been accomplished elsewhere without increasing the size of the police force and without interfering with the patrolman's usual duties."—From the *Youngstown Survey Public Health Reports*, September 29, 1916.

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A New Enemy of the Rat: The Woman's Club.—The age-old conception of woman squealing and dashing for the nearest chair at the sight of a rat must be revised in the face of the news that the Women's Municipal League of Boston, under the leadership of Mrs. A. T. Leatherbee, has embarked upon a rat-extermination campaign.

Readers of the JOURNAL will remember seeing in these columns of the October number an account of the theory of Dr. Mark W. Richardson that poliomyelitis is transmitted through the agency of the rat flea. Immediately following the publication of this theory, the League announced its program of rat-destruction.

The circular of the League points out not only the menace as a pathological agency but repeats the claim of government experts of the economic waste occasioned by the rodent pest.

As to the intended procedure of the League we read further, as follows:

"The Women's Municipal League intends to go about this matter in a perfectly practical manner along lines already proved effective. It will form rat clubs, which will work in coöperation through the entire city, which clubs will be instructed by competent rat catchers in the most desirable and effective methods of rat extermination. In this work they have the hearty support of the Mayor and the City Administration, and the endorsement and official coöperation of the City Board of Health. To prosecute properly this undertaking, it will be necessary to raise funds from public subscription, but as rats are destroying nearly one and one-half million dollars of property yearly in the city, the League feels that the people should be glad to subscribe a few thousands on this work, realizing that every rat killed means the extinction of its progeny, which are to be figured in the hundreds yearly. While they hope that it may be possible with time, the enactment of proper ordinances and the general education of the people as to the true habits of rats, to make the city ratless, they know that

much can be done now in exterminating large numbers. If San Francisco could in a few months destroy over 500,000, surely Boston can do as well. They hope for the generous support of the citizens."

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The Spreading Movement for Birth Control.—

That this movement is rapidly spreading is evident to anyone that reads the daily newspapers. Attention is further called to this fact by an article in *The Survey* for October 21, 1916, under the foregoing title.

An interesting incident emphasizes that interest in the subject is not limited to social reformers alone:

"Last week birth control was, for the first time, made the subject of a judicial opinion. In the Court of General Sessions, New York City, Judge William H. Wadhams suspended sentence upon a woman, mother of six children, who had pleaded guilty to a charge of burglary, her second offense. His investigation showed, the judge declared, that the mother had made a hard but unsuccessful attempt to support her children since the father had been driven from his work in garment making five years ago. Meantime, two of the children had been born. Said Judge Wadhams:

"Her husband is not permitted by the authorities to work because of his being ill with tuberculosis. It would be dangerous for him to work on children's garments. It might spread the consumption to the innocents. There is a law against that. As a result of this law the husband has had no work for four years.

"Nevertheless, he goes on producing children who have very little chance under the conditions to be anything but tubercular, and, themselves growing up, repeat the process with society. There is no law against that.

"But we have not only no birth regulation in such cases, but if information is given with respect to birth regulation people are brought to the bar of justice for it. There is a law they violate. The question is whether we have the most intelligent law on this subject we might have. These matters are regulated better in some of the old countries, particularly in Holland, than they are in this country.

"I believe we are living in an age of ignorance, which at some future time will be looked upon aghast."

"Commenting on the decision editorially, the *New York World* said:

"Whether or not one agrees with it, such an opinion from the bench in effect lifts up and dignifies a topic that has mostly come in for surreptitious discussion. It is at best a delicate topic and one needing to be treated with a certain reserve. Yet it is a topic to which society can no longer close its eyes. And in the circumstances it is preferable to have it discussed frankly and without the half-secrecy in which lay its worst element of danger."

"The mother of six on whom sentence was suspended is in charge of a charitable society."

We learn further that birth control leagues have already been formed in Boston, Cleveland, Ann Arbor, Chicago, St. Louis, Los Angeles, San Francisco, Portland, Ore., Seattle, Detroit, Racine, Wis., Milwaukee, St. Paul, Minneapolis, Spokane, Denver, Washington, D. C., and Pittsburgh.

A national organ, the *Birth Control Review*, with offices at 104 Fifth Avenue, New York City, is about to make its appearance, with Frederick A. Blossom as managing editor.

The path of the birth control educators is not easy, for we read that in Portland, Ore., Mrs. Margaret Sanger, a local physician, and five others were arrested for distributing leaflets. Nevertheless, birth-control information is said to be at present more freely disseminated there than in any other city. A quiet house-to-house canvass is now being carried on to reach mothers of the working class.

In Boston, also, a young newspaper man, Van Kleek Allison, was arrested for printing a birth control article in his monthly magazine, *The Flame*. He was given a prison sentence of three years.

The case has been appealed and a vigorous agitation in Allison's behalf is being conducted by the Massachusetts Birth Control League.



Health Insurance in a Student Community.—Compulsory health insurance among students is in vogue at the University of California. The sting usually attached to compulsion, however, is effectively balmed by the exceptionally low fee of \$6 per year.

In an article from the September 23, 1916, number of *The Survey*, contributed by Edith

Shatto King, the system is described in detail. The student receives all the free medical advice, treatment, hospital care and nursing that he may require, no matter how prolonged or serious his illness,—all for \$6 per year.

This measure was the result of a discovery by Dr. G. F. Reinhardt, first director, that lack of interest and poor attendance records were due in a large measure to sickness.

"The aim in this health insurance plan is, first, to eliminate so far as possible sickness as a cause of disability in university classes; second, to control communicable diseases; third, with the coöperation of the physical training department, to turn out a high physical type of man and woman; and fourth, to teach the value of "a stitch in time saves nine" as applied to health.

"Every student registering for work at the university is insured for the time he remains at the university. The present fee of \$6 a year is compulsory. All students are cared for without distinctions of race, color, or ability to pay for service rendered. For instance, no extra payment will secure a private room, as it will at Harvard, Princeton and Cornell. If a private room is required because of the nature of the disease, one is provided; if not, and a ward bed is more convenient, the student is placed in a ward. In other words, strict democracy is maintained as far as service rendered to the student is concerned.

"There is no suggestion of charity, since the students have paid coöperatively for whatever service they get. No state funds are drawn upon for the infirmary service. Outside of the insurance fee there is no extra charge, say for surgical or dental work. A minimum fee for operations is charged—for example, \$100 for a major operation. For dental service the rate is \$1.50 an hour. This includes the entire cost, except for gold and fifty cents for the plate if an X-ray is necessary. It is the avowed aim of the authorities to reduce these fees yet further as rapidly as funds will permit.

"The infirmary system of the University of California is one of group medicine. One physician does not attempt to treat all manner of ailments, but the staff divide the work according to their various specialties—internal medicine, surgery, eye, ear, nose, and throat, orthopedics, X-ray examinations, immunization, etc. The

medical and surgical staff have fixed annual salaries and receive no fees whatever from individual students."



Defects among Rural School Children.—

While the city child has recently been receiving considerable medical school inspection, his brothers and sisters in the "little red schoolhouse" have been largely overlooked, possibly on the theory that the country is the most healthful place for a child. However, Dr. Taliaferro Clark of the Public Health Service points out that recent investigations indicate an especial need of rural school inspection, because:

"(1) They constitute 60.7 per cent. of the total school enrollment of the country; (2) they are largely denied the medical attention of specialists such as may be had in hospitals and clinics in cities; (3) they cannot be protected *en masse* by health laws as is the case in urban communities; and (4) they are more unduly affected by endemic diseases which diminish vital resistance and exercise an injurious influence on physical and mental development, such as malaria, hookworm, and pellagra."

Dr. Clark points out that an intensive rural survey of Porter County, Ind., schools showed a marked under-development among many children, the deficiency in weight varying from 0.2 to 5.9 per cent. in boys and 0.6 to 8.9 per cent. in girls.

Errors in diet are held largely responsible and the establishment of domestic science classes is recommended as a corrective. Lack of facilities for play and systematic exercise are suggested as causes for subnormal physical development of a number of children.

The fact is pointed out that diseased tonsils and defective teeth have in the experience of the Public Health Service been more prevalent among rural than among city school children, while defective hearing is more than twice as common (rural, 12.1 per cent. urban, 5 per cent.). Faulty illumination and ignorance of child hygiene are quite frequently observed.

The remedies proposed for the improvement of these conditions are: (1) abolishing school districts and establishing a county unit of school administration; (2) establishing an efficient system of health supervision of school children; and (3) by consolidating rural schools

—"The Physical Care of Rural School children," *Public Health Reports*, October 6, 1916.



Urge Medical Examination for All.—Plans for the observance of National Medical Examination Day on December 6 were announced recently by the National Association for the Study and Prevention of Tuberculosis.

The National Association, together with other organizations, is advocating an annual medical examination for every person, sick or well, and December 6 has been set aside as one of the feature days of Tuberculosis Week, December 3 to 10. Anti-tuberculosis Associations, state and local boards of health, women's clubs and other societies are coöperating to interest everyone possible in the subject of at least one medical examination a year, preferably on this special day. Physicians will make special arrangements to devote December 6 to medical examinations, and clinics and dispensaries will prepare to receive those who cannot afford to pay a physician.

Some of the reasons why the human machine should be inspected at least annually, as given in a free pamphlet on "Periodic Medical Examinations," issued by the National Association are these:

The physically perfect man is almost impossible to find. Almost everyone who has reached the age of thirty has some impairment or defect of his body. Out of 2,000 men and women examined, 70 per cent. were found to have impairments of a more or less serious nature, while all of the remaining 30 per cent. had some defects of a minor character.

Out of the thousands who have been examined and found to be impaired, only 10 per cent. imagined there was anything wrong with them; the remaining 90 per cent. supposed themselves "perfectly well." Many little defects or impairments may be found which, if allowed to continue without treatment, may result in serious and perhaps fatal illness, such as Bright's disease, tuberculosis, etc.

A thorough physical examination is not expensive, and it is worth the cost to know where one's health account stands. If an inspection of your body reveals a little break that can be repaired for a dollar or two, which is cheaper: to let that little break continue until it becomes chronic tuberculosis, cancer, or Bright's disease,

which will cost hundreds of dollars to treat and which may never be cured—or to stop it at its very beginning?

The time to prevent disease from sapping your vitality is before it gets a foothold. The best way to discover disease early is to have a periodic overhauling of your body, at least once a year.



Combating Insects Affecting the Health of Man.—Continued advances in the work of combating the activities of insects affecting the health of man are reported by the chief of the Bureau of Entomology of the U. S. Department of Agriculture in his annual report recently issued. In mosquito investigations in Louisiana a species of mosquito hitherto considered a non-carrier of malarial infection was proved to be a carrier. Studies have been made of malaria and measures are being evolved to meet plantation conditions.

The "starvation" plan, aimed to exterminate the spotted fever tick of the Bitter Root Valley, Montana, was followed during the year with encouraging success. The plan consists of the removal of the domestic hosts of the adult tick from the infested areas. The Bureau also conducted a campaign of extermination against ground squirrels and other rodent hosts of the immature ticks. Examination of the rodents killed showed 40 per cent. lower infestation by the tick than during the preceding year.

The report directs attention to the demonstrations of the Bureau specialists that the breeding of flies in manure can be prevented by treating the substance with calcium cyanamid and acid phosphate, which at the same time increase the fertilizing value of the manure.

The Bureau also conducted investigations into methods of lessening fly infestation in packing establishments operated under the Meat Inspection Service of the Department.

Industrial Hygiene and Sanitation.

Child Labor in Maryland, 1915.—The Twenty-fourth Annual Report of the Bureau of Statistics and Information of Maryland, according to the *Monthly Review* of the U. S. Bureau of Labor Statistics, August, 1916, pertains almost entirely to the extent of child labor in Maryland and the administration of laws designed to protect it. There are over 155,000 children between the ages of 10 and 16 years in Maryland, 18 per cent. of whom are employed. The state expenditure for this particular department during 1915 were \$17,618. Permits are being refused to children who have not completed the fifth grade. The largest group got work as the result of financial need. The second largest group is ambitious to learn a trade. A large number look merely for a chance to get away from the irksome school duties. One of the most common occupations is newspaper selling. It is rather surprising to find that 12½ per cent. of Baltimore newsboys are to be found on the docket of the juvenile court, 95 per cent. of the school children admitted to the parental school for repeated truancy have been news-

boys or street traders, and 43 per cent. of the children at the Maryland Industrial School (a reform school) have been engaged in some street trade. During 1915 the bureau found 1,463 violations of the child labor law of which 905 were found in Baltimore. There were instances in which parents cunningly attempted to falsify birth certificates. A new child labor law went into effect in June, 1916. This law is largely identical to the former one except for some changes in the method of administration. The law limits the working hours of all children under 16 years of age to 8 a day and to 48 a week.



Connecticut Refuses Compensation.—An interesting decision has been handed down by the Supreme Court of Errors of Connecticut. An employee of the American Steel and Wire Company contracted lead poisoning in the course of his employment and was incapacitated for a short time. The court denied compensation to the plaintiff, thus establishing the principle that occupational diseases do

not come within the terms of the workman's compensation law in Connecticut. The full text of the instructive decision is to be found on page 2797, *Public Health Report*, October 6, 1916.



An Industrial Accident Prevention Conference was held at the hall of the house of representatives in Harrisburg, Pa., on March 23, 1916. It is probably the first assemblage of its kind ever held in the United States. Representatives of capital estimated at \$5,000,000,000 met leaders of labor, representing 1,000,000 workers. Commissioner John Price Jackson, of the Department of Labor and Industry, called attention to the fact that for January, February and March, 1916, the total of industrial accidents in the state was 64,944. The number killed was 623. Governor Brumbaugh impressed the audience with the seriousness of the figures and pointed out that the number of accidents can be reduced to perhaps one fourth of the present number without a doubt. The enactment of the Compensation Law by the last legislature was given due credit. The governor also pointed to the successful campaign to reduce the number of accidents carried on by the United States Steel Corporation since 1906. Commissioner Jackson suggested the formation of safety organizations. "The organizations should be so made that its personnel may, from time to time, be modified in order that as many more connected with plants as possible may have placed upon them a personal responsibility for the safety of the plant and its people." Twelve practical suggestions are made for the cardinal activities of such organizations. Samuel Gompers spoke on "Labor's Share in Reducing Accidents." A resolution was passed recommending the organization of employees and employers in Pennsylvania for safety. Such a safety organization "shall be headed by the chief executive of the company and shall include representatives of the employer and employees." It was further resolved to urge attendance of the annual Pennsylvania Safety Conference and thus to perpetuate the object of this Conference.—*Monthly Bulletin*, Pennsylvania Department of Labor and Industry, May, 1916.

Cost of Living—State of Washington.—According to a report issued by the bureau of labor of the state of Washington, the cost of living has greatly increased since April, 1914. The increase in various cities varies from 1 to 10 per cent. The estimate is based on the cost of 58 different articles. Unfortunately no estimate has been made of the cost of living for the state as a state.



Labor Legislation of Massachusetts in 1916.—Of importance was the law providing the reduction of the waiting time for the commencement of compensation payments from two weeks to ten days. Another act declared the equality in all respects of all neutral liability companies authorized to do business in the state with the Massachusetts Employees' Insurance Association, which was created by a special provision of law for the purpose of writing compensation on insurance. It is contemplated to investigate the conditions of labor in hotels and restaurants, the subject of giving special training to injured persons, and to provide for the appointment of a special recess commission on social insurance, which will devote itself to a study of effect of sickness, unemployment and old age in Massachusetts.—*Monthly Review* of the U. S. Bureau of Labor Statistics, August, 1916.



The Working Child in Print.—All the speeches on child labor made in Congress since the first federal child labor bill was introduced in the spring of 1906 and other printed arguments for and against federal control of child labor which had appeared before June 30, 1916, are listed in two sections of the bibliography on child labor just issued by the Federal Children's Bureau.

Material on practical experiments in training children for industry and in guiding a child to the trade where his opportunities are best and material on the effect of premature labor on the child's health form special sections. Previous bibliographies on vocational training and vocational guidance, and other subjects related to child labor such as mothers' pensions, minimum wage, and compulsory education, are noted in the bulletin.

Other sections contain references on child labor laws and their enforcement in various states, and

the problem of uniform legislation. Of the 1,828 references in the bulletin, 445 are on individual industries, and 315 on child labor in foreign countries. The bulletin includes an author and subject index.

A first edition of this list was published by the Library of Congress ten years ago, and the present revised and greatly enlarged list has been compiled by the chief bibliographer of the Library of Congress with the assistance of the librarian of the Children's Bureau. The List of References on Child Labor may be obtained free upon application to the Chief of the Children's Bureau, Washington, D. C.

✱

Physicians Oppose Compensation Act.—"A number of physicians, representing the members of the Massachusetts State and Massachusetts Homeopathic Medical Societies, met in Worcester on September 20, and made formal protest against one section of the workmen's compensation act of that state. It is declared that the law, as it now stands, works a hardship on the workman as well as on the physician, in that it deprives the former of the right to call on a physician whom he knows—the family doctor. Plans were formulated for an active campaign before the next session of the legislature to have the act amended."—*Medical Record*, October 7, 1916.

✱

New Bureau of Standards for Safety Devices.—At a meeting in New York the officers and directors of the Safety First Federation of America, states the *American City*, October, 1916, instituted a Bureau of Standards to pass upon the merits of various safety devices. The Bureau is to investigate such devices as are submitted for approval. If the directors approve the device officially the manufacturer may use the official emblem of the Safety First Federation in his advertising, and each article so endorsed may be stamped with the Federation emblem, and the words "Inspected and Approved by the Bureau of Standards, Safety First Federation of America, Inc."

Plans were prepared at the meeting for enlarging the membership and extending the work of the Federation and also for a nation-wide campaign to educate pedestrians to use the crosswalks instead of crossing the streets diagonally or in the middle of the block.

Health Insurance.—I. M. Rubinow, New York (*Journal A. M. A.*, September 30, 1916), gives the arguments in favor of industrial health insurance. Though he admits there are other classes to which the benefits might apply, he confines his argument mainly to the needs of the wage-worker. The health preserving effect of the money benefit gives a better chance for recovery. It needs no showing that recovery is seriously interfered with under conditions of poverty and worry, and the bare amount that is often given by trades union funds, etc., is not sufficient. Equally important for its curative effects and prevention of relapses is the chance gained to stay away from work when the physician advises rest. The administrative officers of the workmen's societies do not sufficiently provide for this. The proper organization of medical aid provided for under the health insurance plan increases its effectiveness and aids in other ways. It can be so arranged as to provide for teamwork among the physicians and placing within the workman's reach the calling in of specialists. The broader meaning of the term "social insurance" as compared with "workmen's insurance" would also include the workman's family and children, who also need the benefit of organized care for health if the general improvement of health conditions is the aim. The problem of the wage-working mother is also to be considered, mortality statistics are necessarily prerequisite to any scientific effort to reduce mortality, and sickness statistics are equally necessary for the improvement of health conditions. The employer feels the new economic pressure, but under a proper health insurance scheme the burden, of course, should be distributed between employer, employee and the state. The American wage-working class has not yet been educated to the necessity of compulsory health insurance, and even those who have seen its importance view it largely from the narrow point of view of immediate financial aid. The willing coöperation of the medical profession is essential if the best results are to be obtained.

✱

Syphilis and Workmen's Compensation.—A workman was injured by an accident in a sawmill at Traverse City, Mich. Under the workmen's compensation law payments were made for a period of 19 weeks, when the employer refused to make further payments, upon the

ground that the employee's continued disability was due to syphilis, which retarded the healing of the wound.

The Michigan Supreme Court decided that payments must be continued. Mr. Justice Person in the opinion said: "The consequences of the injury extend through the entire period, and so long as the incapacity of the employee for work results from the injury, it comes within the statute, even when prolonged by preëxisting disease."

The opinion is published in the September 29th issue of the *Public Health Reports*.



Industrial Accident Insurance.—Emmet Rixford, San Francisco (*Journal A. M. A.*, September 30, 1916), reviews the various legislation as regards industrial worker's compensation, pointing out how in our modern civilization such legislation has become inevitable and its relations to the medical profession, and pointing out such defects and drawbacks as have been brought out by the experience of the public and more especially of the medical profession. He especially discusses the experience of California with what is known as the Workmen's Compensation, Insurance and Safety Act, passed in 1913, and effective in 1914, and amended in the following year. The law applies to all employees except farm, ranch or dairy labor, domestic service and casual employment. It provides for an industrial accident commission of three who have charge of the enforcement of the law, and establishes a state compensation insurance fund administered by the commission. The proceedings are public records and their hearings have the force of courts of law, but with a far less formal procedure. The law requires full medical and surgical attention for injured wage-earners for the first ninety days, making it obligatory on the insurance carrier to furnish medical, surgical and hospital treatment, including supplies and apparatus reasonably required at the time of the injury, and within ninety days thereafter or longer as the commission decides. The power given these commissions in California and other states makes it all important that they should be composed of broad-minded men of unimpeachable integrity, strong enough to be just in case of criticism and be free from political control. California has been fortunate in the personnel of its first commission, which has been in office long enough

to establish precedents which will be difficult to overrule. Its attitude toward the medical profession is that of high appreciation. Rixford describes the methods and fee schedule authorized by the commission, and the various relations established with the medical profession to secure good service properly compensated. The corporations, as a rule, maintain their own hospitals and surgeons, in some cases making generous contributions to the funds contributed by the employees, and giving them a voice in the election of the surgical staff. Many interesting questions have come up in the way of judicial decisions on contested points, but the attitude of organized labor to organized accident insurance has not yet taken shape, and is somewhat difficult to understand. The labor unions seem dissatisfied without the privilege of free choice of physicians and surgeons, at least to some extent. The difficulty of securing the coöperation of the patient in the management of his case is a problem of much importance. Exaggeration or overestimation of symptoms has given trouble, and some individuals have been seriously damaged through their insistence and become almost unfit for making a living through their own fault. It is particularly difficult to eliminate malingerers and sometimes almost impossible. As a matter of fact, there has been a great increase in the number of cases of traumatic neurosis and hysteria following accidents since the law went into effect. It is uncomfortable and unfair to the medical profession that the burden of proof is in so many cases on the doctor to show that the patient is well enough to return to work. Hernia, because of its great frequency, its proneness to occur in middle age and the popular notion that it is the result of strain, is nearly always attributed to some accident. There is little or no evidence that oblique or inguinal hernia is ever produced by a single strain. It is due to repeated strain, generally, however, often received in the course of labor, and it is in some sense an obligation on the part of the industry to repair the damage. Chronic arthritis is another condition which is a common source of controversy.

These are only some of a good many interesting points that arise in relation to the employer and employee. Rixford ends his paper as follows: "I would repeat that social insurance against industrial accident constitutes a great world

movement. Already in force in thirty-one states in America, it is sure to be adopted in the remaining seventeen, and to be followed by insurance of the working classes against illness. The idea has come to stay and must be seriously reckoned with by the medical profession. If the medical profession accepts it in a proper spirit and accommodates itself to it, there is sure to result not only immeasurable good to the working classes, but also much good in the direction of improvement in the practice of surgery and in the practice of medicine as well."



The Industrial Hygiene Section at Cincinnati.

—The papers and discussions presented before the Industrial Hygiene Section of the American Public Health Association at the recent Annual Meetings held in Cincinnati, Ohio, were of unusual value. Persons interested in this phase of public health work, who were unable to attend these meetings, will be given an opportunity of reading these excellent papers in subsequent issues of the JOURNAL.



Miner's Mystagmus in the United States.—

This occupational disease has been but little investigated in this country. A recent government bulletin (Department of the Interior, Bureau of Mines, Bulletin No. 93, prepared by Frederick L. Hoffman), reviewed by the *Monthly Review* of the U. S. Labor Statistics, August, cites the European experience with this disease. Two possible causes of the disease are mentioned. One is the eyestrain due to working in a badly lighted space with black light-absorbing surfaces; the other is strain of the extrinsic muscles of the eye, especially of the elevator muscles, due to the position of the miner when at work. The principal symptoms are, oscillation of the eyeball, headache, giddiness. The movement

of the eyeballs is rotary and to and fro, rarely vertical. Tremors of the muscles of the head and face are often associated with the trouble. In one variety of the disease the symptoms are absent or latent and the man is unaware of the trouble; in the other the man is more or less incapacitated. In England the mystagmus seems to be on the increase since the safety lamps have been introduced. When candles are used it is rare. It is rare in people under thirty years of age, and scarcely ever appears until after ten years of work. Recovery may be expected if the work is discontinued within three to twelve months. The preventive measures are periodical medical examination for the presence of refraction errors, for any signs of incipient mystagmus, and for physical and mental debility. Dr. T. L. Llewellyn (*British Medical Journal*, June 28, 1913) found that most cases occurred where the average candle power of the lamp was the lowest. He suggests the improvement of the miner's lamp and the introduction of electric light. The rate of cases in England per 10,000 coal miners was 4.7 in 1908, and in 1912 it was 29.8. Compensation is paid in accordance with the Bristol Dockman's Compensation Act. The statistical report of the Baelum Miner's Union in Germany shows that of all the invalidity cases on account of which compensation was paid, 1908–1912, 18.2 per cent. was the result of mystagmus. The number of cases of mystagmus per 1,000 members receiving benefits from the sick fund from 1905–1909 was 3.29. No statistical data is available in the United States. The number of people employed underground is estimated at 596,470 for the year 1913. An investigation in the United States mines using exclusively or extensively safety lamps should be of interest. It is not probable that the disease is wholly absent in our mines.

Personal Notes.

Dr. W. H. Brown, formerly epidemiologist of the Massachusetts State Department of Health, has been appointed health officer of Bridgeport, Conn.

Dr. John R. MacDowell of Zanesville, Ohio, has been appointed chief of the Division of Public Education and Tuberculosis of the State Board of Health of Ohio.

Dr. E. A. Martin has resigned his position as assistant receiving physician at the Cincinnati Tuberculosis Association to enter the United States Public Health Service.

Dr. G. J. Van Vechten has been appointed director of the Department of Health of Scranton, Pa.

Mr. Howard G. Osborne has resigned his position at Drummondville, Quebec, to become chemist and health inspector at East Chicago, Ind. Mr. A. W. Hedrich, the former incumbent, resigned in order to study at the Harvard-Technology School for Health Officers.

The following persons were elected to membership in the American Public Health Association at the forty-fourth annual meeting, Cincinnati, Ohio, October 24-27, 1916:

Jack J. Hinman, Jr., Iowa City, Iowa.
 W. O. Bullock, M. D., Lexington, Ky.
 Arthur Ferguson Shuey, State Board of Health, Jacksonville, Fla.
 K. F. Schmidt, B. Sc., Columbus, Ohio.
 Leo S. Hexter, Columbus, Ohio.
 F. E. Deeds, Ph. C., B. A., Columbus, Ohio.
 Corice C. Pearl, Norwalk, Ohio.
 Chester C. Funk, M. D., New Albany, Ind.
 Emanuel M. Meyer, Cincinnati, Ohio.
 Edwin J. Appel, Health Bureau, Rochester, N. Y.
 B. S. Cerswell, M. D., North Yakima, Wash.
 Bertha F. Johnson, M. D., Trenton, N. J.
 E. R. Chambers, B. S., Houghton, Mich.
 L. A. Woolf, M. D., Ravenna, Ohio.
 Richard B. Norment, Jr., M. D., Hagerstown, Md.
 Groesbeck Walsh, M. D., Care of T. E. I. Co., Birmingham, Ala.
 P. O. Collins, Elyria, Ohio.
 Richard A. Feiss, Cleveland, Ohio.
 John H. Stokes, M. D., Mayo Clinic, Rochester, Minn.

Herbert L. Clark, M. D., Topeka, Kans.
 Charles H. R. Campbell, M. D., San Antonio, Tex.

Frankwood E. Williams, M. D., Boston, Mass.
 Bert Emory Fahrney, M. D., La Salle, Ill.
 L. C. Ludlum, M. S., Highland Park, Mich.
 Grace L. Meigs, M. D., Children's Bureau, Washington, D. C.

Paul Preble, M. D., U. S. P. H. Service, Cincinnati, Ohio.

H. M. Guilford, M. D., Minneapolis, Minn.
 D. B. Weeks, Marian, Ohio.
 Charles F. Dight, M. D., Minneapolis, Minn.
 A. R. Murphy, New York City.
 Howard W. Green, A. B. S. B., Elyria, Ohio.
 E. B. Starr, M. D., Springfield, Ohio.
 James C. Coffey, Worcester, Mass.
 P. E. Hurley, M. D., Holyoke, Mass.
 Martin C. Woodruff, M. D., Health Department, St. Louis, Mo.

Cooper Gaw, City Board of Health, New Bedford, Mass.

J. U. Paquin, M. D., City Board of Health, New Bedford, Mass.

F. H. Peck, M. D., New York City.
 Joseph D. Findley, M. D., Altoona, Pa.
 Thomas F. Harrington, M. D., State Deputy Commissioner of Labor, Boston, Mass.
 E. E. Smith, 2d, Cincinnati, Ohio.
 Joseph S. Bolten, M. D., Cincinnati, Ohio.
 Charles V. Craster, M. D., City Board of Health, Newark, N. J.
 Henry S. Stern, M. D., Richmond, Va.
 A. L. Mann, M. D., Elgin, Ill.
 A. A. Spocr, M. D., Bacteriologist, Lansing, Mich.

Frank S. Drown, Children's Bureau, Washington, D. C.

Sherwood Dix, M. D., Health Officer, Port Norfolk, Va.

Charles A. Nelson, Minneapolis, Minn.
 J. H. Sencindiver, Washington, D. C.
 Guy H. Turrell, M. D., Smithtown Branch, N. Y.

Seneca Egbert, M. D., Philadelphia, Pa.
 Joseph R. Glennon, City Board of Health, New Bedford, Mass.

City Board of Health, Columbus, Ohio.
 Augustus Baldwin, Lorain, Ohio.

Arthur Pannenberg, M. D., Chicago Heights, Ill.

Hasbrouck DeLamater, M. D., Kansas City, Mo.

E. G. Folsom, M. D., Mt. Clemens, Mich.

M. S. Fraser, M. D., Chief Medical Officer of Manitoba, Winnipeg, Man.

Ohio State Board of Health, Columbus, Ohio.

Edward Evans, M. D., F. A. C. S., La Crosse, Wis.

Jno. R. Scully, M. D., V. S., H. O., Waycross, Ga.

Frederick A. Blossom, Managing Editor, The Birth Control Review, New York, N. Y.

Daniel V. Sherban, Pittsburgh, Pa.

George Sewell, M. D., Detroit, Mich.

H. W. Stoner, M. D., Baltimore, Md.

Barnett Cohen, New Haven, Conn.

Homer I. Huntington, B. S., Cumberland, Md.

Henry S. Brown, Providence, R. I.

Maximilian Herzog, M. D., LL. D., Chicago, Ill.

W. D. Dotterrer, Board of Health, Princeton, N. J.

Carl E. Buck, Oak Park, Ill.

Alexander Bresth, Boston, Mass.

Prof. E. Esquerre, Pittsburgh, Pa.

Wilmer Krusen, M. D., Philadelphia, Pa.

Arthur A. Brown, M. D., Swamscott, Mass.

Vernon Robins, M. D., Cambridge, Mass.

James C. Martin, M. D., Highland Park, Mich.

Illinois Manufacturers Association, Chicago, Ill.

Harry W. Redfield, Washington, D. C.

F. J. Ennis, M. D., Burlington, Vt.

George F. Butler, A. M., M. D., Attica, Ind.

Charles S. Miller, M. D., Philadelphia, Pa.

W. A. Dittmer, M. D., Manchester, Ia.

Current Public Health Literature.

AMERICAN.

Albany Medical Annals.

XXXVII. October.

Scope of Practical Examination in Routine School Medical Inspection. C. P. McCord.

Some Manifestations of Colon Bacillus Infections of the Urinary Tract. F. Van Der Bogert.

American Journal of Nursing, Baltimore.

XVII. October.

Tracing the Sources and Limiting the Spread of Infantile Paralysis. Charlotte Talley.

Reaching the Rural Mother through Lectures.

American Journal of Sociology, Chicago.

XXII. September.

The Organization of Will. E. A. Ross.

Sentimentality and Social Reform. A. J. Todd.

Factors which Have to Do with the Decline of the Country Church. A. T. Bernard.

War and the Democratic State. L. L. Bernard.

A Neglected Opportunity and Duty in Journalism. V. S. Yarros.

Implications of a Standard of Living. M. B. Hexter.

Durable Monogamous Wedlock. J. E. Cutler.

The Social Elements of the Indian Problem. A. C. Parker.

Boston Medical and Surgical Journal.

CLXXV. October 26.

Anterior Poliomyelitis. A. J. McLaughlin.

Artificial Heliotherapy. John Bryant.

October 12.

The Massachusetts Tuberculosis League. V. Y. Bowditch.

The Plan of the State Department of Health for More Tuberculosis Nurses. E. R. Kelly.

The Visiting Tuberculosis Nurse. Mary Van Zile.

Tuberculosis in Rural Communities. Vanderpoel Adriance.

October 19.

The Regulation of Venereal Diseases in Australia.

Elimination of the Rat.

Journal of the American Medical Association, Chicago.

LXVII. September 30.

Syphilis in the Southern Negro. H. L. McNeil.

Surgical Aspects of Industrial Accident Insurance. Emmet Rixford.

Health Insurance in Its Relation to Public Health. I. M. Rubinow.

Health Insurance; Its Relation to National Health. B. S. Warren.

Some Bacteriological Observations on Epidemic Poliomyelitis. George Mathers.

October 14.

Meddlesome Midwifery in Renaissance. J. B. DeLee.

October 21.

The Etiology of Epidemic Poliomyelitis: Preliminary Note. E. C. Rosenow, E. B. Towne, G. W. Wheeler.

Experimental Studies in the Etiology of Acute Epidemic Poliomyelitis. J. W. Nuzum.

Immune Human Serum in the Treatment of Acute Poliomyelitis. C. W. Wells.

Bacterial Vaccines in Treatment of Pulmonary Tuberculosis. S. G. Bonney.

Medical Record, New York.

90. October 14.

A Tuberculosis Survey of an Alaskan Eskimo Village. H. C. Michie.

October 21.

The Management of Poliomyelitis, with a View to Minimizing the Ultimate Disability. R. W. Lovett.

October 28.

Milk and Communicable Diseases. L. R. Williams.

November 4.

Acute Poliomyelitis. H. L. Abramson.

Tuberculosis and Cancer. William M. Dabney.

Medical Times, New York.

XLIV. October.

A Further Study of the Comparative Results of the Wassermann Test. A. A. Uhle and W. H. McKinney.

The Air of School Buildings. J. W. Redway.
Food and Feeding in Childhood. J. Epstein.
German Diet and Cancer. Editorial.

November.
The Necessity of Analyzing Drugs for Army Use. H. S. Baketel.
A Review of the Ninth Revision, U. S. Pharmacopœia. G. C. Diekman.
The Girls' Feet: Elementary Principles in Their Care. A. C. Jacobson.

New Orleans Medical and Surgical Journal.

69. November.
Dr. Carlos J. Finlay's Positive Cases of Experimental Yellow Fever. C. E. Finlay.
Finlay and Delago's Experimental Yellow Fever. Aristides Agramonte.
Investigations on the Prevalence and Clinical Features of Intestinal Bilharziosis (Schistosomiasis Mansonii) in Porto Rico. I. G. Martinez.

New York Medical Journal.

CIV. October 14.
The Postfebrile Treatment of Anterior Poliomyelitis. D. D. Ashby.
Epidemic Poliomyelitis. W. S. Bryant.

October 28.
Rabies. M. B. Wesson.
Food and Efficiency. Martha B. Tracy.
Is the Pasteurization of Milk Advisable? Editorial.
The Contamination of Milk. Editorial.

New York State Journal of Medicine, New York.

16. October.
The Vision of the School Child. F. P. Lewis.
The Therapeutic Importance of a Scientifically Conducted Health Resort. W. B. James.
Scope of Practical Examinations in Routine School Medical Inspection with a Consideration of Standard Record Cards. C. P. McCord.

Modern Hospital, St. Louis.

October.
The Modern Hospital as a Health Factor. F. D. Keppel.
Disinfection and Other Methods of Preventing the Spread of Infection in Hospitals. R. J. Wilson.
The Municipal Water System of Pateros, Washington. Using a Store Window for a Health Exhibit. Leon Banly.

Public Health, Toronto.

VII. October.
Civic Problems Caused by the Immigrant. J. M. Shaver.
Meat Inspection. A. J. Hood.
The International Congress of the Diseases of Labor. Wm. Oldright.
Sanitation of a Modern Military Camp. J. W. S. McCullough.
Carriers of Disease. Sir James Grant.
Industrial Hygiene and Diseases of Occupation. E. W. J. Hague.

Public Health Nurse Quarterly, Baltimore.

VIII. October.
How the Public Health Nurse Can Help to Control Cancer. Curtis E. Lakeman.
The Money We Need. Alice Brayton.
Tuberculosis Nursing. Mary Beard.
The Public Health Nurse and the Anti-Tuberculosis Campaign. P. P. Jacobs.
Some Problems in the Training of School Nurses. Anne H. Strong.
Visiting Nursing in the Skin Department of the Massachusetts General Hospital. Dorothy Atkinson.
A Municipal Occupational Disease Bureau. Florence E. Perry.
Industrial Nursing. Alice L. Eastman.

Southern Medical Journal, Birmingham.

IX. October.
Syphilis in Its Relation to Public Health. Loyd Thompson.
Some Public Health Aspects of the Cancer Problem. C. E. Lakeman.

November.
The Importance of Counting Puss Cells in the Urine. F. B. Block and K. Nyun.
Exact Estimation of Complement in Wassermann Technique. James S. Fleming.

Texas State Journal of Medicine, Fort Worth.

XII. October.
National Health Insurance Law.
The Texas Liability and Compensation Act.
Provision for Medical Care under Health Insurance. Alexander Lambert.

United States Public Health Reports, Washington, D. C.

31. September 29.
Pharmaceutical Exhibit at Philadelphia. M. I. Wilbert.
Public Health Administration in Youngstown, Ohio. Carroll Fox.

October 6.
American Pharmaceutical Association. Report of Annual Meeting at Atlantic City, N. J. M. I. Wilbert.
The Physical Care of Rural School Children. Taliaferro Clark.

October 13.
Poliomyelitis. The Status of the Disease in New York City and Surrounding Territory. C. H. Lavinder.
A Sickness Survey of North Carolina. Lee K. Frankel.
Drinking Water on Interstate Carriers. J. O. Cobb, C. L. Williams, and H. P. Letton.

October 20.
Mottled Enamel and Brown Stain. A Condition Affecting the Teeth in Certain Localities. F. C. Smith.
Destroying Lice on Typhus Fever Suspects. S. B. Grubbs.

October 27.
Sanitation in the Philippine Islands. J. D. Long.
The New Editions of the Pharmacopœia of the United States and the National Formulary. M. I. Wilbert.

ENGLAND.

Journal of the Royal Sanitary Institute, London.

XXXVII September.
Conference in London, Discussion on Sanitary Administration under War Conditions.
Address, The Rt. Hon. The Lord Mayor of London, Col. Sir Charles Cheers Wakefield.
Municipal War Economies and the Maintenance of the Standard of Sanitation. H. Percy Boulnois.
The Maintenance of the Standard of Municipal Sanitation during the Continuance of War Conditions. James Wheatley.
The Administration of the Mental Deficiency Act of 1913, from the Social and Educational Standpoints. A. B. Ritchie.
Flies and Refuse Heaps. W. H. Symons.
Bath as a Health Resort. Preston King.
The Insanitary Gully. J. T. Neech.

Journal of State Medicine, London.

XXIV. October.
The Intensive Specific Treatment of Epidemic Cerebrospinal Meningitis. D. A. Welch.
Arthritis Deformans in Relation to Industrial Conditions. Peel Ritchie.
Housing in Lanarkshire. J. F. Wilson.

Medical Officer, London.

XVI. September 30.
Employment of Children out of School Hours.
The Incorporated Sanitary Association of Scotland. Annual Congress at Edinburgh.

October 7.
Effect of Strict Milk Inspection.
Defective Eyesight in Schools. C. S. Thomson.

October 14.
School Medical Work in 1915.
Quarantine Period for Measles. M. B. Whyte.

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PSYCHIATRIC CLINICS IN THE SCHOOLS.

JOHN T. MACCURDY, M. D.,

*Psychiatric Institute, Ward's Island; Visiting Neurologist, Randall's Island,
New York City.*

Read before the General Sessions, American Public Health Association, Cincinnati, October 24, 1916.

The purpose of this important paper by Doctor MacCurdy is to point out why psychiatric clinics in the schools may offer reasonable hope of reducing insanity in the later life of the pupils. And since it is undoubtedly true that the next problem of public health administration will be concerned with mental disorders, where better to begin than with the school child?

THE members of this Association do not need to be told what a drain the constant occurrence of insanity makes on the state. Mental aberrations, however, are not always severe enough to demand sequestration; in fact, it is likely that there are many unstable individuals who never become actually insane, for every patient who suffers that legal and social stigma. The prophylaxis of insanity is, therefore, as much a problem of conserving and augmenting the efficiency of many so-called normal citizens as it is of saving the state the cost of supporting the hopelessly incompetent.

In the advance of medicine in other fields we have become familiar with the general trend of the history of treatment of any given disease. There is

first the palliative and empiric treatment of symptoms; next, when its causation is established, comes rational and specific cure of the disease as such; and, finally, there is prevention. Psychiatry, it must be confessed, has not progressed far beyond the first stage, although of recent years much has been learned of the specific pathology of some psychoses. That this pathology does not concern itself entirely with anatomy and laboratory findings makes it often less tangible to the average practitioner, but none the less actual. It is probably safe to say that the psychology of the abnormal is as accurate a science as bacteriology or pharmacology. In spite of this advance in the theory of psychic disturbances, we are faced today with no diminution, perhaps

with an increase, of the incidence of insanity. It is time for psychiatrists to offer a definite program of prophylaxis and an important part of this is concerned with education. It is the purpose of this paper to show why psychiatric clinics in the schools may offer reasonable hope of reducing insanity in the later life of the pupils.

It is not necessary to expatiate to this audience on the advantages of physical hygiene during the period when the nervous system is completing its developments, and its functions becoming habitual reactions. I can proceed at once to the problem of mental hygiene as such. How far does its sphere extend? How much may the education of children be expected to contribute to it?

Let us begin by considering what general factors seem to determine mental aberration. There are two rough divisions, or, to speak more accurately, perhaps, two extremes of type to be met in psychopathology. In one the preponderant factors are physical and specific, such as infections, intoxications, injuries and degenerations of nervous tissues. These cases are characterized by a loss of the purely mechanical intellectual processes of memory, calculation and the like. In the second and opposing group we have no primary intellectual defect but rather disturbances in the emotional and ideational spheres. These latter show no constant or specific autopsy findings, but the symptoms can be shown very often to be a development of previous faulty mental habits which have rendered the patient incapable of ready adaptation to the

demands of life. In other words, this pathology is a psychological matter.

For the first, or organic, group much can often be done by early diagnosis, but, as even the premonitory symptoms seldom develop in the school age, the aim of psychiatric clinics in the schools must be the prevention of the mental and nervous diseases that fall in the constitutional or functional group.

It is becoming constantly more evident to psychiatrists that there is a striking similarity between the type of mental processes seen in the functional psychoses and that of children. To make this plain I need only mention that in each we observe a slight grasp of reality: the seriousness of the child's make-believe is closely allied to the fixity of a delusion. That one is normal and the other a psychotic phenomenon is determined essentially by the age of the subject. In other words the abnormal subject has never entirely outgrown his tendency to think and act as he did in the nursery. In the normal and ideal development the individual seems spontaneously to develop a more adult type of thinking as the growing responsibilities of life become more urgent. This ideal development rarely, if ever, proceeds with absolute smoothness and nothing can disturb its harmony so completely as the sudden demand for an adaptation for which the subject is constitutionally unprepared. Two obvious conclusions may be drawn from this. First, that the primary object of education must be to foster this development rather than to instil mere knowledge. Tools are of no use without the

ability to use them, and the youth who has not outgrown the mental attitude of the nursery when he faces the outside world is not helped to acquire that attitude by the acquisition of facts or the ability to run up a column of figures. The second is that, since school life is generally the first great adaptation which the child meets on leaving the nursery, it may easily hinder his development if he be incapable of meeting its demands. His careful observation at this point may lead to a discovery of his latent inelasticity of character at a time when such defect may be remedied. The function of the psychiatrist in the school would therefore be twofold: to guide the education of the normal child with a view to maintaining his normality, and to detect and remedy abnormal tendencies.

The objection is sure to be raised that this is not psychiatry but pedagogy. When the millenium comes this will certainly be true, and before that we may assume that psychiatry exists because pedagogy has been unable to fulfil its aims. Practically, however, the fields are at present distinct for the simple reason that the detection of abnormality in a child is much too subtle an affair to be achieved by the intelligence of the average teacher with the average training. Examinations in history or arithmetic, even the Binet scale, may show what ability the child has to absorb and release facts. The psychiatrist is interested in the finer, the emotional reactions of the scholars.

A small beginning has been made by the provision of ungraded classes in

many of our public school systems, but these classes seem to become filled with those who are backward intellectually rather than abnormal in their type of thinking and emotions. These classes do excellent work for the feeble-minded, because they can be treated gregariously. Their defects are common to all. The abnormal child presents an entirely different problem. He may be precocious intellectually and lead his class, yet give his teacher or parents more trouble than any other pupil. Either teacher or parent is, as a rule, satisfied to pigeonhole the unlucky scholar as mischievous, possessed of a bad temper, shy, naughty or just "queer." If the character anomaly of the child has affected his capacity to learn he may find his way into an ungraded class but the psychiatrist will discover the bulk of his material among those who make their grade on schedule but nevertheless present problems demanding intensive individual study. If only psychopathic children were admitted to the ungraded class much more could be done for them there, but overrun as they are with defectives, the pupils who enter it are apt to be told by their fellows that they are in the "dummy class." For children already handicapped with morbid sensitiveness, the ungraded class then becomes a burden. It is better, if possible, to keep the child in contact with his more normal mates but have his discipline and education made more elastic under the supervision of a competent psychiatrist. Such suggestions at once raise the cry that "discipline" demands the equal treatment of all pupils in

the same class. As a matter of fact it is just this uniformity which is so baneful. If the intrusion of psychologists into the school did no other service than disrupt the time-honored custom of forcing all children into the same mould, they would still do the state unspeakable good. A jockey who took no more account of the varying personalities of his horses than the prevailing public school systems study their pupils, would be a flat failure. When one considers the appalling social losses today suffered through neuroses, insanity and crime, a large part of which are traceable to perverted development, the responsibility of the school system is seen to be grave.

Of course the public school is not the only factor in the education of children. Home influences are at least as important, if not the paramount factor in the development of the child. One of the greatest difficulties under which teachers labor is that their pupils come to them so often from the worst possible environment. The neurologist and psychiatrist when studying the life-history of their neurotic and psychotic patients are constantly wishing that they could have begun a generation earlier and treated the parents, whose theories of child nurture are so unsound or whose carelessness has been so extreme. It seems as if the average father and mother thought that the character of children just "grew" like Topsy and that the children are culpable if they fail to grow properly. If the state could teach paternity and maternity and then hold parents respon-

sible for the lapses of their children, we would have many fewer criminals, insane and neurotics. But how can this education be given? How can the parents be reached?

This is an ambitious program, but psychiatric clinics in the school can certainly help to put it into effect. The history and examination of the abnormal pupil are not complete until the home has been thoroughly investigated. Similarly no treatment can be efficacious if it does not operate both in school and home. In this way the state can gain an entrance into the home and give the advice where it is most needed. It is gratifying to know that, in the beginnings of such clinics as now exist in New York, improvement in the mental health and happiness of the children examined has not always been confined to those who showed obvious need of treatment but has been evidenced in the more normal brothers and sisters. No home environment can be improved for one without benefiting all. We have, therefore, good ground for the hope that in psychiatric school clinics we may find an agency that will bring better coöperation between school and home in the greatest task of the state, the making of its citizens.

This Association is probably not interested in knowing the details of organization of such clinics. As a matter of fact these material considerations can only be matured by experiment and such work as has already been done is the merest beginning. It is understood, of course, that each clinic should consist of at least one trained psychiatrist, sufficient sten-

ographic force to keep all records, and a social service staff to obtain information in the homes, bring parents to the clinic, where possible, and oversee the extramural treatment. Naturally it would be the duty of every teacher in the school to be a "social service worker" in the school; they would be considered part of the clinic.

It is of more interest to discuss, even if only in generalities, the kind of problems with which the clinics would deal. Time does not permit the recital of clinical cases, but you are all familiar with what are known as "difficult" children; those who have read Healy's book on juvenile delinquents will be conversant with the grave consequences which such abnormalities may entail. Children have so little of that self-consciousness which enables adults to formulate their motives that their conduct is apt to be described in moral rather than psychological terms. This undoubtedly makes their study more difficult but the difficulty is more than offset by the rewards of treatment. The child's mind shows a plasticity quite foreign to the fixity of the adult's mental habits. The task of the psychiatrist is to find out why the child won't study, seems to hate a certain subject, is shy with his playmates, is given to violent tempers, is afraid of his teacher or prefers her society to that of the "gang" after school is over. A hundred such tendencies, all inimical to smooth development, have their history and when this is unravelled the various factors may be altered or offset by other influences.

As cannot too frequently be repeated, this means individual study. Even two children from the same home may have been reared under totally different influences. One may be a father's or mother's favorite, the other a scapegoat. Obviously this individual study presupposes personal interest and is effective only in so far as mutual confidence is established. When this is achieved a great deal can be done for the child which parents cannot do out of ignorance and teachers fail to accomplish through lack of personal touch. As an example of this we may consider a question of such fundamental importance as sex enlightenment. Parents fear the topic and are more often than not the victims of popular superstitions as to bare facts. On the other hand to lecture to a classroom on such a topic is so difficult a task as to be almost ludicrous. The emotional potentiality of this instinct is so great and its exhibition so various that it is impossible to adapt one's words to the needs of each in the group. I have had the experience of talking to medical students on adolescent difficulties and precipitating a breakdown in one of them. An individual talk, on the other hand, almost invariably does good. It is plain that no one could be better entrusted with this important and delicate task than the psychiatrist who suffers under the disabilities of neither teacher nor parent and has wider knowledge than either. Only those who treat neurotic patients can realize what incalculable later suffer-

ings such an opportunity for early enlightenment would prevent.

Many of you are probably beginning to think that the psychiatrist I am describing is usurping the function of the family physician. This is largely true. With the growth of departmental dispensaries for the poor and the consultation of specialists by those of larger means, the patient is losing what he once had, a confidant, father confessor and doctor in one. This loss is not to be made good by the abandonment of specialties but by the development of a new one—psychiatry. The modern psychiatrist is one who makes a scientific study of the problems whose solution previously were left to the kindness and common sense of the general practitioner. The psychiatrist must assume this burden because it is only by this mental hygiene that he can prevent the ravages of neuroses and psychoses. As a public servant he can ply his trade nowhere to better advantage than in the schools.

A word may be said about the place of these clinics in the general organization and routine of the school. As the psychologist is constantly experimenting he must always be in a position to advise what subjects are most advantageous to the pupil and what are useless or harmful. If his advice be taken, the time will come much sooner when the object of education is to teach the child to think and behave effectively rather than to amass impedimenta of facts. Again, only those whose spirit is experimental can safely be trusted with the responsibility of discipline, for it is notorious

that children vary greatly in their reaction to disciplinary measures. A word of reproof may depress one, embitter another, while correcting a third. Similarly corporal punishment may be mental torture to one, make another stubborn and impress a third as a fair *quid pro quo*. A psychologist who has studied the child may be able to predict the result; at least, he would never be guilty of the folly of trying to remedy ineffective discipline by its repetition. Discipline would therefore most logically be placed in the hands of the clinic.

At another point, too, the psychiatrist is sure to upset traditions. As his standard of education is not the accumulation of facts but the ability to adapt, he will counsel the retention of the teachers who can train minds and urge the dismissal of those neurotic pests who owe their positions to a mere facility in acquiring and disgorging information. We are constantly being impressed with the fact that what is commonly spoken of as neuropathic, hereditary taint is largely to be accounted for on the basis of environment. The neurotic parent may transmit his taint in varying degrees but we do know that he always fosters neurotic reactions in the child. It is the neurotic parent who is impatient, over affectionate or aloof. This is bad enough in the home and such people are hard to persuade of their error, but why should it be tolerated in the school? Yet we all can recall teachers the nature of whose teaching and discipline depended on how they slept the night previous.

Finally, a word as to the need of psychiatric studies of children for psychiatry itself. There are problems in this science that can only be solved in this way. For instance, consider dementia præcox. This disease we know as a group of symptoms that appears in late adolescence or early maturity. But we now know more: that the disease was already present in the make-up of the child and that the more obvious symptoms appear when the youth comes more into contact with a world he is incapable of meeting. Owing to the great difficulty in getting intelligent anamneses we shall never know the full extent of this "make-up" nor how far it can be modified

until we have large data from many children. With the hereditary factor as prominent as it is in this disease we can be fairly sure that many children are born congenitally incapable of changing their mental constitutions. When many such have been examined and the later history of the subjects followed, we shall be able, I hope, to discriminate between the good and bad features of a faulty make-up. Until this is done no set of statements gathered from adults can ever really teach what the dementia præcox make-up is and how far it is alterable. The psychiatrist, therefore, needs the schools just as the schools need the psychiatrist.



THE AUTOMOBILE AS A CAUSE OF POLIOMYELITIS.

The newspapers have given an unusual amount of space to the recent epidemic of poliomyelitis, which is remarkable in view of the small number of cases of this disease as compared with epidemics of such diseases as scarlet fever, diphtheria and other exanthems. An explanation is to be found in the insidious nature of the disease and its serious after-effects, in addition to the high mortality. Naturally there has been a large crop of sensational statements as to its causation and treatment. Not the least remarkable is one which has gone the rounds of the press during the past week. This paragraph reports a statement to the effect that the epidemicity of poliomyelitis is due to the fumes produced by automobiles. As the announcement is alleged to have been made before the American Public Health Association, public opinion may possibly attach undue importance to it under the impression that it is endorsed by that association. Of course to maintain such a theory it would be necessary to show that epidemics of poliomyelitis did not occur before the development of automobiles, and that they do not occur now in places in which there is little or no such development.

Since 1841, when the first epidemic of this disease was reported, though not recognized, in Louisiana, until the present day, a number of these outbreaks have occurred. It will be necessary to mention only some which are inconsistent with the theory advanced in the statement referred to. Such are an epidemic of forty-three cases in 1877 at Stockholm; an epidemic of from 150 to 160 cases in the summer of 1894, in Otter Creek Valley, Vt., and an outbreak in 1899 in Norway. All of these occurred before the development of the automobile industry. In 1905 and 1906, epidemics occurred in Norway with a total of 1,053 cases, especially prevalent in the northern part of Norway. No one will allege that the northern parts of Norway even now, ten years later, are places where poliomyelitis could, by any twist of the imagination, be attributed to "gases and fumes given off in the atmosphere by the combustion of oils and fluids used in automobiles." *Post hoc, ergo propter hoc* is a familiar fallacy; *ante hoc sed propter hoc* is as novel as it is startling.—*Journal of the American Medical Association*, November 4.

THE RELATION OF ALCOHOL AND SYPHILIS TO MENTAL HYGIENE.

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Read before General Sessions, American Public Health Association, Cincinnati, Ohio, October 24, 1916.

Formerly the problem of mental hygiene was considered too large and indefinite a problem to be considered from the public health viewpoint. But if this problem be divided into its constituent parts, most of these parts, considered separately, are manageable. Doctor Williams here discusses two of these groups—alcoholic and syphilitic insanities.

NOT so many years ago an insane person was supposed to be possessed of a devil. A still less number of years ago insanity was considered a moral rather than a physical or psychological disease, and the insane person was supposed to have sinned so seriously that God had turned against him and had taken from him his reason. Until comparatively recent times the field of mental disease has been so enwrapped in an atmosphere of mystery and the supernatural, that it has been considered a field for the metaphysician and the moralist rather than for the physician.

No intelligent person believes today, however, that an insane person is possessed of a devil, and no one believes today that an insane person has in some unusual way transgressed spiritual laws. But there are intelligent people who still believe that disappointment in love, failure in business, masturbation, so-called overstudy and the like are important causes of mental disease. "Mortified pride," "agita-

tion on the approach of matrimony," "metaphysical hair-splitting," "pre-disposition excited by novel reading," "the complete gratification of every wish of the heart," "changes from ordinary to vegetable and abstemious diet," are some of the assigned causes which are to be found in hospital reports of comparatively recent times. In a quite recent Ohio report, I found Christian Science assigned as a cause of mental disease.

Because of the lack of understanding of the nature of the disease, because of the apparent mystery attached to it, and because of the manifold manifestations of the disease and its apparently manifold causes, mental disease has not been considered a fruitful field for public hygiene. Were the factors formerly assigned as the causes of mental disease the true causes, there would be little room for mental hygiene, for people would continue to make love, to enter into business and to read novels, regardless of the possible danger of mental disease.

But modern methods of study and

research have been applied to mental disease within the last twenty years just as they have been applied in other fields of medicine, and the results have been illuminating. The problem, considered as a whole, is confusing. But, like most large problems, it is found to be divisible into its several constituent parts, and these parts considered separately are in many instances found manageable. I shall discuss but two of these parts: the group of alcoholic and the group of syphilitic insanities.

When we come to discuss the part that alcohol plays in the production of mental disease, we must speak with the greatest caution. There is already current a great deal of misunderstanding and misinformation on the subject. It is of the utmost importance that we distinguish between alcohol as a primary and fundamental factor in the production of mental disease, and alcohol as a contributing or social factor in the production of mental disease. If we confuse the two we shall be wholly misled in the results we may hope to obtain by proper prophylactic measures.

Fifty years ago, before the causes of mental disease were really known, the superintendents of the insane hospitals in the country were united in their belief that alcohol was the chief cause of insanity, and the reports of those years devote pages to the discussion of the havoc wrought in mental life by alcohol. But, as so often happens, a more careful study of the problem has shown that the early reports are inaccurate, due to a frequent getting of the cart before the

horse. The excessive drinking of alcohol, which leads to the production of what are known as the alcoholic psychoses, is frequently but a symptom of a previously existing and underlying nervous and mental condition. A comparatively mild, but important type of mental disease, exists in many of these individuals long before they become alcoholic, and their becoming alcoholic is, in fact, dependent largely upon this previous mental condition. The feeble-minded individual who, because of his feeble-mindedness, has less resisting power to social temptations, and who consumes alcohol to the point of developing alcoholic hallucinosis, figures in the statistics of our hospitals as a case of mental disease due to alcohol. Obviously, however, mental disease of a serious kind existed in the individual before he came to the attention of the hospital, and had there been no alcohol for him to consume, he would still have been a case of mental disease in the community, making for inefficiency, creating intricate social problems, and multiplying his own kind. This is one type of individual who is coming to our hospitals with alcoholic mental disease, in whom alcohol is not the fundamental factor. Others are those suffering from mild attacks of manic depressive insanity, certain types of dementia præcox, and the psychoneuroses.

I wish to emphasize this point. If we assume that 20 per cent.—and many enthusiasts have placed the figure at 80 per cent.—of insanity is due to alcohol, and work upon that basis, we are going to find that with alcohol abolished, should the time

come, we shall be disappointed in the comparatively small diminution that will take place in the amount of mental disease in the community. It is obvious, therefore, that the figures which are published today by the majority of our state hospitals as to the per cent. of alcoholic psychoses in their institutions, are not reliable as evidences of the amount of insanity produced by alcohol. That figure would be difficult to obtain, and I do not believe that any exact figure exists today. On the other hand, the figures which are issued annually by the state hospitals are of very great importance in showing the amount of mental disease that it is necessary to care for in our state hospitals at public expense, because of alcohol. Had there been no alcohol in the community, the feeble-minded or neurotic individual who previously had been doing sufficiently well to maintain his place in the community, would not have developed alcoholic hallucinosis, and would not have been brought to the state hospital to be cared for at state expense. This is true of a large proportion of the alcoholic cases brought to the hospitals. Alcohol has not been the fundamental cause of their mental disease, but granting their mild form of mental disease, alcohol has super-imposed a serious condition which has made necessary their care in a hospital. I insist that this is a distinction with a real difference. It is of the utmost importance that in our search for the causes of mental disease we do not confuse cause with effect.

The part that alcohol plays in the fundamental production of insanity we do not know. On the other hand, in the consideration of the more immediately practicable problem,—the amount of mental disease it is necessary to care for at public expense because of alcohol, we do know, and the figures are important.

The hospital reports of Massachusetts from 1910 to 1914 give the following as the per cents. of patients admitted suffering from alcoholic psychoses:

Year.	Per cent.
1910.....	22.15
1911.....	19.16
1912.....	17.40
1913.....	18.46
1914.....	18.99

In other words, Massachusetts, during this period, was forced to expend large sums of money to care for persons suffering from mental disease within its borders, and during these years from 17 to 22 per cent. of the patients cared for were brought to the hospitals because of alcohol.

In New York, when a greater effort has been made to sift out alcohol as a fundamental cause rather than as a contributing cause, the per cent. runs about 12. Where alcohol as a contributing factor is taken into consideration, the per cents. are somewhat larger than those in Massachusetts, running from 25 to 30 per cent.

It is difficult to ascertain, from Ohio reports, just what elements have been taken into consideration in reporting alcoholic cases, but the reports give a per cent. of from 15 to 20.

Hospitals in general agree at about the figure 20 per cent. In other words, 20 per cent. of the patients under public care in our hospitals for the insane are there because of alcohol.

In considering the social and economic side of the problem of mental disease, these figures are important and are reliable. In considering the strictly medical and biologic side of the problem, these figures are not reliable; but for our immediate purposes this is not important.

In dealing with syphilitic insanities we are dealing with a much simpler situation, so far as fundamental etiology is concerned. Syphilis, as we know, is no respecter of persons, and it is not necessary for a person to be feeble-minded or otherwise mentally affected in order to contract syphilis or to have syphilis produce a serious and fatal mental disease. The great majority of syphilitic patients in our state hospitals are there essentially because of syphilis. Such other factors as may enter in are of so little importance that they can be disregarded. State hospital figures on the incidence of syphilis are, therefore, of importance.

Ten per cent. of the patients who enter the Massachusetts state hospitals are suffering from syphilitic insanity. Fifteen per cent. of the patients at the Boston Psychopathic Hospital—a specialized hospital where the per cent. would be supposed to be larger—suffer from syphilis. In the New York state hospitals 12.7 per cent of the patients admitted suffer from syphilitic mental disease. In Ohio,

12 per cent. of the patients admitted annually, come because of syphilis. When it is remembered that the Massachusetts state hospitals admit over 3,000 new patients each year, the Ohio over 3,000, and the New York over 6,000, the significance of these per cents. is apparent.

In order to understand, however, just what these figures might mean in an economic sense, Miss Elizabeth M. Walker and myself have made a careful study of 100 patients who have died at the Boston State Hospital of syphilitic insanity. This study has not been wholly completed, but I can give some figures that may be of interest. In selecting our material only those cases in which the diagnosis was verified by autopsy have been chosen, and there was no selection other than this,—the cases being selected in rotation as they came to the autopsy table.

Here were 100 men, engaged in various pursuits. Seventy-eight were married; 22 were single. They were economic units in the community, each supporting himself, and in many cases each supporting others,—each of value to himself, to his family, and to the community. Each made his daily and weekly contribution in the work of the world. Syphilis intervened, with insanity and premature death resulting.

An estimation of the loss of life, based on insurance tables showing the expectation of life, and taking into consideration such factors as race, occupation, etc., shows that the loss of life in individual cases had been from

8 to 38 years. The 100 men lost a total of 2,259 years.

By the intervention of this disease, these 100 men ceased to be productive. The hospital records show the earning power before commitment to the hospital of only ten men, so that the loss of earning power can be estimated for but 10. Previous to their commitment these men were earning from eleven to thirty-seven and one-half dollars a week. The financial loss created by the premature death of these 10 men, based upon the expectation of life and their earning capacity before commitment, was \$212,248. But these men not only lost their earning power; they became parasitic upon the community. The hospital residence of the 100 men amounted to a little over 126 years, or an average of a little over one year apiece. This, at the cost of six dollars per week to the state of Massachusetts. For the maintenance of these men, the Commonwealth of Massachusetts expended over \$39,312.00. By the intervention of this disease, wives and children were left unsupported. Wives were left to shift for themselves and to care for their children unaided. The continuity of the home life was destroyed; the children who should have continued in school in preparation for their life in the community, were turned out at an early age upon the community, either to work in unskilled labor for the support of themselves and other members of their family, or as public charges in charitable institutions. One hundred and nine were so left. A not unimportant per cent.—this per cent. has not yet

been determined—were diseased, and thrown upon the community in a crippled condition, their disease being directly due to the infection of their fathers.

These are figures—2,259 years' loss of life; \$212,248 loss of earning power (10 men); \$39,312 expended by the state for support; 109 children cheated of their rights of home protection—for but 100 male patients in a representative hospital, but from them we may gain some notion of the tremendous loss to the community each year due, and due entirely, to syphilitic mental disease.

Mental disease constitutes a serious public health problem. Massachusetts in the last ten years has received over 26,000 *new* patients into her state hospitals. They come at the rate of over 3,000 *new* patients each year. In the last ten years, Massachusetts has expended over \$35,000,000 in the maintenance of these individuals. Twenty per cent. of the patients who have come have come because of alcohol; 10 per cent. have come because of syphilis.

The state of New York receives over 6,000 *new* patients each year, and in the last five years has expended over \$37,000,000 in their maintenance. Approximately 25 per cent. of these patients have come because of alcohol or syphilis.

Ohio receives 3,000 *new* patients into its hospitals each year, and in the last three years has expended close to \$13,000,000 in their care. Twenty to 25 per cent. of these patients have come because of alcohol or syphilis. Massachusetts, New York and Ohio

have expended over \$80,000,000 in the last five years for the maintenance of patients in their insane hospitals, and from 25 to 30 per cent. of the patients in these hospitals have come because of alcohol or syphilis.

There are today in the state of Massachusetts 1,500 professional men and women, business men and women, artisans, laborers, going about their various pursuits and pleasures, who in the next five years will be committed to some state hospital suffering from syphilitic mental disease. This figure is not a guess. It is easy of computation. It is below rather than above the actual figures. It is based upon the average admission rate to the Massachusetts hospitals for a period of years—and the rate of admission each year increases rather than remains stationary or decreases—and the per cent. of syphilis in the yearly admissions, a figure that tends to remain comparatively constant. There are 3,000 people in Massachusetts now about their work, who, in the next five years, will be committed because of alcoholic insanity. Within the boundaries of the state of New York, there are over 6,900 persons now at their business, who will be taken to the state hospitals of New York in the next five years suffering from either alcoholic or syphilitic insanity. In Ohio, there are 3,000 such persons. In the three states of Massachusetts, New York and Ohio, over 14,000

persons, who are now productive units, will, on account of syphilitic or alcoholic mental disease, be withdrawn from the community in the next five years, and taken to the state hospitals for the insane, where most of them will be supported at public expense.

This is a situation that cannot long be ignored. Alcoholic and syphilitic insanities are as unnecessary as typhoid fever.

Alcohol is clearly an important exogenous factor in the production of mental disease; we must not forget, however, the endogenous nature of much of the so-called alcoholic psychoses. Effective prophylactic measures will deal with both ends of the problem.

Time will not permit a discussion of the prophylaxis of syphilitic mental disease. I would make but two points. First: it is time that, as students of public health, we ceased to lay the emphasis upon the venereal nature of syphilis, which, after all, is its least important part, and put the emphasis where it belongs, upon the fact that it is a contagious disease. Second: to use current expressions of the day, it is time we stopped "pussyfooting about" in our dealing with syphilis, that we stopped "mollycoddling" the disease, and that we placed it where it belongs—in the category of such diseases as smallpox and leprosy—and treated it accordingly.



The number of suicides reported for 1915 by the U. S. Bureau of Census was 11,216, or 16.7 per 100,000 population. The suicide rate has not varied very greatly during the past ten years.

THE RELATION OF SOCIAL AND ECONOMIC FACTORS TO MENTAL HYGIENE.

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Read before General Session, American Public Health Association, Cincinnati, Ohio, October 24, 1916.

The causal factors of mental disorder or maladjustment are either in the individual himself, or environmental. It is with this latter case that the author chiefly deals, and calls to our attention some of the factors in our social organization which touch upon the problem of the formation of habits of adjustment, and which determine the nature of the environment to which the individual must adjust himself.

MODERN medicine is largely preventive in its ideals, and the student in his researches must be ready to go beyond the individual to the study of the complex environmental factors, which play such an important rôle in the occurrence of disease. In no department of medicine is the preventive aspect more important than in psychiatry, that branch of medicine which deals with mental disorders. Psychiatry does not merely include the study of "insanity," a term which has more legal than medical significance; it embraces a wide range of disorders, the pathological nature of some of which is frequently ignored, while others are not honestly called mental disorders by the physician in view of social prejudice.

Thus neurasthenia is a mental disorder, whether the relatives like the fact or not; so is hysteria; as examples of mental disorders not recognized as such may be cited many cases of ill-balanced enthusiasms and fads, of marital incompatibility and family estrangement, of prejudices and

infatuations, of revolt and intolerance, of day-dreaming and unproductive endeavor.

The causal factors of both the mild and grave forms of mental disorder or maladjustment may be chiefly in the individual, or may be largely environmental; where the cause lies more especially with the individual there may be at least two very different sources of the disorder. The disorder may arise on the basis of some structural or nutritional damage to the central nervous system; on the other hand, the disorder may be the culmination of very faulty habits of adjustment, the onset being precipitated by some definite situation.

To outline the most favorable environmental conditions, and to formulate the rules of hygienic conduct, would mean to sketch a new utopia and to give a counsel of perfection.

Our present task is more modest; it consists in calling attention to some factors in our social organization, which touch the problem of the formation of habits of adjustment, and which determine the nature of the

environment to which the individual has to adjust himself.

For efficient adjustment to the complex demands of the environment a certain constitutional equipment is requisite, and many individuals lack this necessary equipment owing to poor hereditary endowment. The infant science of eugenics is probably better utilized in sober education of the conscience of the community, than in the promotion of fantastic legislation; but even with our present knowledge an intelligent community should make it impossible for any civil sanction to be given to such outrages as the marriage of an insane girl to a purchased bridegroom, or the marriage of an imbecile girl to a degenerate man.

With regard to those disorders of adjustment where the difficulty lies chiefly with the individual, reference may be made to two preventable forms of organic brain disease, namely to brain disease caused by syphilis and to that caused by chronic alcoholism. The social and economic factors which favor the spread of syphilis and the development of chronic alcoholism demand the attention of the community. To stimulate the intelligent coöperation of the community the relevant facts must become widely known; for instance, it would be well for the thoughtful citizen to know that in one metropolitan area every fifth male patient admitted to the hospital for the insane is suffering from syphilitic brain disease. But how can the knowledge be placed before a community which is unwilling to face disagreeable truths? The daily papers of New York City, almost without

exception, in reporting a conference on mental hygiene, did not dare to print the word syphilis lest their readers should be offended. This atmosphere of timidity in the face of serious hygienic problems is a social factor which tends to postpone the development of better sexual standards.

With regard to the problem of chronic alcoholism it is gradually being recognized how interwoven it is with complicated social and economic conditions.

If we pass from the disorders due to organic brain disease, and consider the vast group of cases where, without gross disorder of the brain, the individual shows a disorder of his social adjustment, either mild or grave, temporary or permanent, the situation is very complex; only a few salient points can be briefly referred to within the limits of this communication. In some cases the influences that mould the habits in the formative period have been inadequate or even detrimental; in other cases adult opportunities of satisfaction have been inadequate, or on the other hand the individual, from nature or lack of training, has been unable to utilize the opportunities available. Thus those balancing interests, social, æsthetic and religious, which carry one through periods of uncongenial work or of disillusionment and sorrow, may never have been cultivated, or unassisted may not find an opportunity for their exercise; adaptation to the demands of married life and of parenthood may have been hampered by early experiences, false attitudes, dishonest conventions; in the declining years of

life the emancipation of the family may leave the parent stranded without individual resources of interest and occupation. The problems of mental hygiene, illustrated by the above remarks, take one into a complicated social and economic field, and each one furnishes occasion for much patient research.

The factors which influence the formation of habits in youth, and thus help to determine the later ability to meet the various tests of adult life in a healthy manner, are chiefly the atmosphere of the home and of the school.

At present the home and the school are unhappily divorced; their closer union is much to be recommended, for in the school organization the community has the necessary apparatus for making the parents somewhat familiar with the best methods and the issues involved. In order that the desirable continuity between the home life and the school life may be established, parents and teachers should meet from time to time. For the teachers to be of use in such relations, they require to have a sound biological attitude towards the training of the young, and to be familiar with the outlines of child psychology and psychopathology; the gerund-grinder is an anachronism. It is obvious that teachers with such qualifications are entitled to suitable remuneration, probably beyond that of the present standards. An intelligent community, however, will face this item in the budget, recognizing that cheap education is false economy. The association of a special clinic with the schools should lead to the early recognition and special

management of neurotic and subnormal children. In this way the parent, teacher and school physician may coöperate in checking the development of unhygienic habits, faulty attitudes, and emotional anomalies.

Where a community pays its teachers mean salaries and restricts equipment, and the task of the teacher consists in handing out to absurdly large classes a traditional body of information to absorb, the adolescent leaves the school with poor habits of thought, with the tendency to replace thoughts with words and to accept with little criticism the dicta of authority, with little training of character and of personal judgment, and without having found himself in the sense of realizing his special aptitudes and thus getting some direction for his adult occupation. To enter haphazard into the first occupation at hand is risky for the individual and uneconomical for the community. The individual risk is increased when the adolescent passes from the school into the rôle of wage-earner with no training for social adaptation, with narrow interests, with valuable aspects of his nature neglected.

The modern highly specialized division of labor means that many workers have tasks of the most mechanical and monotonous nature; industrial hygiene is much concerned about the lungs, the blood and other organs of the workers, but that the task is soul-deadening appears to be of little interest. Mental hygiene cannot ignore that fact; for it aims to develop those qualities which give to human life its value and without which the preservation of the most superb physique loses all its

meaning. Mental hygiene aims to supplement and thus to justify physical hygiene.

Employers of labor might well be encouraged to take an interest not only in the ventilation of their factories, but also in the moral atmosphere which is so important for their employees; psychologists may come to be employed not only in the interests of the employer to increase the workers' industrial value, but in the interests of the workers to increase their value as individuals.

Mental disorders tend to thrive on the soil of faulty habits and unsatisfactory environment; with uncongenial occupation, with sources of recreation limited through lack of training in appreciating the harmonies of life, with sense of personal and civic responsibility uncultivated, with no clear realization of the sound basis of good sexual standards, the continuation of healthy adjustment depends altogether on original constitution and luck. To them the individual will owe his preservation from sexual indiscretions, from injudicious mating, from drifting into aberrant methods of satisfaction such as chronic alcoholism. In the face of any special stress or strain due to the vicissitudes of life, his training has done little to safeguard him by developing those balancing factors which are so important, the feeling of social solidarity, outlets for healthy intellectual and æsthetic interests, and a religion which may or may not conform to that of any denomination, but which brings him into some fellowship, inspired by ideals of service.

In trying to find the best means to

aid his patient in regaining mental health or avoiding a breakdown, the physician is disheartened by the lack of available social organization. It is easy to give the patient general directions, to talk of recreation, of increasing his social affiliations, of taking some part in altruistic work. Where the individual is closely attached to a religious body, he may find in its various activities a congenial opportunity for the cultivation of many interests and from his religious director derive support and stimulus. But with many patients religious affiliations have very formal value, and modern society has not replaced the support and comfort of the religious organization by adequate substitutes. For the better educated and privileged classes opportunities for healthful recreation, social intercourse and stimulating intellectual activities may be satisfactory. For the poor the situation is different; the various possibilities of satisfaction for the many-sided demands of our nature, which are available for the privileged, are here reduced to the saloon and the moving-picture theatre; with many no training has enabled them to make use of the art treasures, the musical performances or other recreative possibilities of their environment. When we look for an opportunity of useful social affiliation, frequently no neighborhood organization exists, and no suitable member of the community is available to act as spiritual director. This lack of social organization makes it difficult for the patient, who has recovered from a mental disorder, to get that satisfaction from varied and healthy activity

in contact with his fellows, which is the best guarantee against the return of morbid moods and individual fancies.

While many women have the same industrial life as men, the large majority find their sphere of activity in the home. The care of children forms a large part of their work, and is of vital importance to the community; yet here, too, as in the case of education in general, the individual receives little training for the adult task. A task which is of supreme importance for the community is left altogether to the instincts and the casual information of the individual. To the intelligent woman few subjects could more readily be made to combine deep scientific interest with great practical importance than the study of the development and training of the child, a field which at the present moment urgently demands wide and intensive research. But in women's colleges there is as a rule no place in the curriculum for this subject. The time may come, however, when the intellectual woman will not feel that the nursery is an unwelcome drag on her higher aspirations, but will see in it a great opportunity for the congenial employment of her intellect. Few fields of scientific research offer more tempting problems at present than the nursery.

The same principles which have been discussed in relation to the productive period, find further illustration in the declining years of life. Then, as earlier, the individual craves satisfac-

tion for his human needs, but the objective sources of satisfaction are becoming limited, the outlook is more restricted, hope no longer is an anodyne for the pain of unsatisfied longings. Even in the absence of any wasting of the brain tissue, adjustment tends to become more difficult, and there may develop querulous discontent, unjustified suspicions, despair as to the future, subjective creations in the place of objective grasp. In many cases the disorder depends on the limited resources of the individual, which have been developed by no social training, and have not been stimulated by the existence in the community of suitable social centers. Such mental disorders are not limited to any community, but affect the farmer and his wife on the lonely farm, the housewife and the worn-out industrial unit in the crowded city.

Each community has its own needs and its own opportunities, and in working out its problems will do well to utilize those agencies which already do such good work on an individual basis.

The optimist looks forward confidently to the time when each community will take its mental hygiene as seriously as its physical and industrial hygiene, and when it will point with no more pride to the cheapness and excellence of its industrial products than to the mental health and happiness of the men and women who make these products.



In Petrograd, during 1915, 250 out of every 1,000 children born died during the first year.

REGISTRATION OF MENTAL DISORDERS.

A. J. ROSANOFF, M. D.,
Kings Park State Hospital, Kings Park, N. Y.

Read before the Vital Statistics Section, American Public Health Association, Cincinnati, Ohio,
October 25, 1916.

Doctor Rosanoff in this excellent paper presents, for our consideration, facts which in the future must yield the coöperation between the psychiatrist and the public health official.

IN THE traditional ideal of medicine all disease,—congenital or acquired, whether caused by infectious agents or otherwise,—all should be prevented, if possible. Practical hygiene has, however, not concerned itself equally with all conditions of ill health: its preoccupation has been with its best and most obvious opportunities. Thus it has heretofore concentrated the bulk of its energies upon the struggle against disease of exogenous origin, especially infectious disease; and the wisdom of such a course has been amply attested by the results attained.

As for the future progress of hygiene, it would seem inevitable not only that its struggle against exogenous factors of disease shall grow to be better organized and more successful, but that its scope, too, shall increase so as to include the more intangible endogenous factors. At least it is safe to say that, as far as mental disorders are concerned, the work of prevention could not be efficiently organized without taking full cognizance of the endogenous factors in their causation. I might add, for the benefit of those

who are not psychiatrists, that this statement implies more than might appear on the surface; for in the field of mental disorders it is perhaps more true than in any other that prevention is better than cure, if, indeed, there is at all such a thing as cure, save by way of rare exception; in other words, aside from prevention there seems to be but little relief in sight beyond mere palliation.

In connection with the main topic of this paper,—the registration of mental disorders,—the questions which arise are, Is registration here, as in the case of infections, likely to be helpful in work of prevention? If so, what cases should be registered?

Among the endogenous causes of mental disorders by far the most important is bad heredity; and the task of prevention here consists in stopping, as far as may be possible, the hereditary transmission of undesirable mental traits. It seems plain that in undertaking such work the first step must be the compiling of a list of cases in which such undesirable traits exist; special measures to be instituted may then be taken under

consideration either for groups of cases or for individual cases, according to indications as they may arise.

Of all measures that have been proposed for the prevention of the hereditary transmission of undesirable traits, it seems now probable that segregation in institutions will prove to be the one that is both effective and practicable. Every state in the country is now constructing facilities for segregation. As the cases to be segregated differ so greatly in their nature, the types of institutions required also differ. The possession of a fairly complete register, and that alone, could afford for each state a basis for adequate and intelligent planning of a comprehensive system of mental hygiene, including legislation, establishment of hospitals, training schools, and industrial colonies, and any other measures that may suggest themselves.

Segregation is nothing but a special extension of the principle of quarantine and holds nothing essentially new to those who are in public health work.

It seems to me that it may be safely concluded that our first question,—Is registration of mental disorders, like that of infections, likely to be helpful in work of prevention?—is to be answered in the affirmative.

Let us now proceed to the consideration of the second question, which is not so easily disposed of, What cases should be registered? The practicability of the plan of registration is dependent on finding a suitable answer to this question.

The current conception of mental disorders, especially as held by the

medical profession, views them as a group of diseases analogous to physical diseases. The fault with this conception is that it leads to an overemphasis of this analogy,—which in fact is very imperfect as far as the majority of cases is concerned,—while the true nature of mental disorders thus fails to receive proper consideration.

The fact is that, aside from such conditions as general paresis, cerebral arteriosclerosis, brain tumor and cerebral traumata, mental disorders are for the most part constitutional in their nature; and, although they are capable of being even more distressing and disabling than rheumatism, cirrhosis of the liver, tuberculosis, or other typical diseases, their nature is far more closely analogous to that of biological traits like color of skin or hair, stature, and color of eyes.

The current conception of mental disorders implies the notion that a sharp line of demarcation is to be drawn between mental disease and mental health and between the several varieties of mental disease which it is customary to distinguish. Just as, by means of proper diagnostic technique and skill, we are able to tell whether or not a person has typhoid fever or cancer of the stomach, so, it is implied, we should be able to tell whether or not a person has a manic-depressive psychosis, or paranoia, or dementia præcox. The fact is that these and other conditions are but extreme members of series of temperamental variations and are connected with one another and with the average or so-called "normal" condition by innumerable transitional

forms, so that there can be no question of lines of demarcation except such as might be drawn arbitrarily.

Finally it is to be noted that the current conception of mental disorders has led to a concentration of the bulk of our energy on mental therapy rather than on mental hygiene.

It is true that great progress has been made in the matter of segregation of mental disorders, but it is remarkable that such segregation has been entirely incidental, being dictated in each case by immediate necessity or expediency and not by a deliberate policy of prevention by way of eugenics. Thus, even in the most highly organized states, segregation has come to be looked upon as a necessary evil, to be reduced in amount as far as may be possible, while, as a matter of fact, it is nowhere as yet as complete and as thorough as it should be.

In the present connection we must ask ourselves the question, Is the current conception of mental disorders, together with its resulting classifications, the best available guide for the enterprise of registration?

There are many reasons why the answer to this question must be in the negative.

One of these is that there are well authenticated cases of manic-depressive psychoses, epilepsy, and other constitutional disorders in persons who have been among the epoch makers and leaders of the world in literature, art, science, and statesmanship; and it is, of course, vastly more common to find similar mental disorders in persons who are in

humbler walks of life but who are, nevertheless, useful, attractive, and in every way highly desirable members of their communities. From the standpoint of society at least the eugenical policy in relation to such cases would be the very opposite of that which might be advocated in relation to other cases of the same mental disorders but characterized by disablement or by antisocial tendencies.

Another reason is that a host of abnormal, undesirable, and even dangerous constitutional traits have found no place in medical classifications because they could not, even by forced analogy, be included under any category of disease. The existence and wide prevalence of such conditions have forcibly presented themselves to us in the course of a survey of mental disorders in Nassau County, New York, undertaken by us about four months ago under the auspices of the National Committee for Mental Hygiene. We are able to mention specifically cases of criminal tendency, sex immorality, shiftlessness and dependency, and marked inebriety, occurring quite apart from insanity or feeble-mindedness as generally defined, yet plainly dependent on inborn and persistent psychic anomalies.

What, then, should be accepted as the guiding principle in the proposed enterprise of registration of mental disorders?

Our experience has led us to feel that the best case is to be made out for the sociological principle. The mind is nothing but an instrument of adaptation of the organism to its environment; and for practical pur-

poses it would seem necessary but to take cognizance of instances of maladaptation sufficiently marked to come to the notice of public officials, charitable organizations, and physicians.

More specifically, the register in each state may include:

1. Cases admitted to hospitals for the insane, public or private.

2. Cases admitted to institutions for inebriates, epileptics, and the feeble-minded.

3. Cases convicted of any crime, exclusive of violations of local laws or ordinances.

4. Cases coming to light in suits for separation or divorce.

5. Cases admitted to almshouses.

6. Cases applying for outdoor relief to overseers of the poor or private charitable organizations.

7. Cases of marked backwardness, truancy, or unruliness in the public elementary schools.

8. Cases of children in orphanages, boarded out and dependent on town or county, etc.

9. Mental cases coming to the notice of physicians in private practice.

Each individual thus registered should receive an identification number, so that future instances of maladaptation reported in his case would be added to his record and not be registered as new cases.

The first registration, it need hardly be said, would by no means imply in all cases a judgment of mental abnormality. It is obvious, on the contrary, that a register containing all such cases will include many of quite normal individuals. The object of

compiling the register in the manner here proposed would be to make sure of including all cases of marked maladaptation and yet avoid a premature judgment as between normality and abnormality.

Where the maladaptation is slight or transitory and possibly to be attributed to unusually difficult combinations of environmental conditions, the data recorded in the case should be sufficient to show it; furthermore, in such cases other instances of maladaptation will not be likely to appear in the course of years against the individual in question; whereas in cases of individuals truly lacking in power of adaptation by reason of poor mental endowment other instances of maladaptation will keep appearing in the record.

Judging from the results of the Nassau County Survey, which has already been referred to, it may be anticipated that after several years' development such a register will show that the bulk of all crime, vice, dependency, and other maladaptations in a given commonwealth is attributable to a comparatively small fraction of the population. Naturally, problems of dealing with such social evils could be much more successfully attacked with the aid of material that would be available in such a register than without it. It is but necessary to realize that such problems are susceptible of scientific treatment, that they are in the truest sense problems of public health and not to be solved in the courts of justice or through the bounty of charity. There is a wide and fertile field here for the coöperation

of the psychiatrist with the public health official.

The idea of registration of mental disorders was suggested to me by Dr. Louis I. Dublin; it appealed to me immediately for reasons which seemed to me very obvious and which I have expressed in this paper. Some time later I was agreeably surprised to learn that this idea had already received the sanction of so competent a body as the British Royal Commission on the Care and Control of the Feeble-Minded and that, furthermore, the details of the proposition, as outlined by the Royal Commission, are almost exactly like those outlined in my paper. Their recommendation reads: "That it be the statutory duty of the Medical Officers of the Local Education Authorities, of the Guardians of the Poor, and of the Public Health Committees, the Relieving Officers of Boards of Guardians, the Medical Officers of Convict and Local Prisons,

the Police, and the Managers of any Homes for Inebriates or any Charitable, Religious or Voluntary Institutions or Societies, or any Naval or Military Authorities, to notify to the Committee all cases of mental defect coming to their knowledge in the course of duty."

You will note one important point of difference between the Royal Commission's proposition and mine, namely, that the judgment as to mental defectiveness is in the Commission's recommendation left to the various agencies dealing with dependency, crime, etc., whereas in my paper it is proposed that the system of registration should not be dependent either on the judgment of such authorities or even on that of persons better equipped, but that the object of registration should be the accumulation of material which should render possible at any time an independent judgment in accordance with the existing status of psychiatry.



PELLAGRA NOT TRANSMISSIBLE.

Owing to a belief widely held that pellagra is a communicable disease, experiments were performed under Surgeon Joseph Goldberger upon 16 volunteers, varying in age from 26 to 42 years. Quoting from *Public Health Reports*, November 17,—

"Seventeen cases of pellagra of various types and of different grades of severity furnished some one or more of the experimental materials.

"The materials were blood, nasopharyngeal secretions, epidermal scales from pellagrous lesions, urine, and feces. Blood was furnished by 4 of the cases, nasopharyngeal secretions by 4, epidermal scales by 5, and urine or feces by 16, of whom 10 furnished both urine and feces, 3 urine without feces, and 3 feces without urine.

"Blood was administered by intramuscular or subcutaneous injection; secretions by appli-

cation to the mucosa of the nose and nasopharynx; scales and excreta by mouth.

"Both urine and feces were ingested by 15 of the volunteers, 5 of whom also took blood, secretions, and scales.

"Observation has been maintained by association with a majority of the volunteers and by visits of inspection, supplemented by reports from the volunteers themselves, 13 of whom are physicians, and by reports from other medical officers of the service with whom they are associated. During a period of between five and seven months none has developed evidence justifying a diagnosis of pellagra.

"These experiments furnish no support for the view that pellagra is a communicable disease; they materially strengthen the conclusion that it is a disease essentially of dietary origin, brought about by a faulty, probably 'deficient,' diet.

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THE STANDARDIZATION AND CONTROL OF THE BUBBLE FOUNTAIN.

With the almost universal condemnation of the common drinking cup has come a very general acceptance of the so-called bubble fountain as a substitute. It is somewhat disquieting, therefore, to find an epidemic of streptococcus tonsillitis traced to infected bubble fountains, and to learn that over fifty per cent. of all the bubble fountains in the institution where this outbreak occurred showed the presence of streptococci, varying from a few chains in some fountains to an almost pure culture in others.* And one's faith in the bubble fountain as an agency of hygiene will not be strengthened by learning that *B. prodigiosus* introduced either by means of a pipette or by the moistened lips into an experimental bubble fountain remained in the water from 2 to 135 minutes.

These observations, however, merely serve to bring home what should long ago have been patent to even the most superficial observer, and that is the necessity for official standards of construction and performance for bubble fountains. The designs of the fountains now on the market, and the principles governing their construction and operation, have been limited only by the ideas of their designers and manufacturers, although clearly the very laws and regulations that have driven out the common drinking cup should have prevented the introduction of a substitute even more dangerous. The investigators of the institutional epidemic of streptococcus tonsillitis referred to above, which they traced to the bubble fountains on the premises, claim that the danger in such devices lies to a certain extent in the delivery of the water in a vertical column and that such

* The Bacteriology of the Bubble Fountain, by Pettibone, Bogart, and Clark, *Journal of Bacteriology*, September, 1916, page 471.

danger can be avoided by delivering the stream at an angle, say 50 degrees, from vertical. If their observations in this respect be verified, an easy means of avoiding danger is apparently already available. But in any event there should be a speedy examination of the bubble fountains now in use or on sale and prompt action taken to prevent the use and sale of such as are liable to spread disease.

TWO NEW SERVICES.

It is with pleasure that the secretary of the American Public Health Association draws attention to the creation of a Health Information Bureau for the use of members of the Association and subscribers to the JOURNAL. A notice to this effect has been published in the advertising pages of the JOURNAL in previous issues and already considerable interest has been shown and questions of various kinds propounded and answered. The service necessarily has limitations; questions are asked which are unanswerable; questions dealing with controversial and uncertain topics cannot be positively and completely answered; information is desired which can only be obtained by the expenditure of money not now available for this purpose.

One of the chief functions of the Bureau is to put people who are in search of information in touch with people who, by training and experience, are in a position to adequately supply the needed facts. The office of the Association is peculiarly fit to perform this latter service, being more or less well acquainted with the lines of work which the members of the Association are engaged in.

It is of course apparent that the opinions rendered by this new Bureau are not to be taken as the official opinion of the American Public Health Association and this point is made plain to all inquirers. It is hoped that many will avail themselves of this service.

Another important but more uncertain step is the formation of a Health Employment Bureau for the members of the Association. Many, especially the younger members, have suggested that the Association might act as a clearing house for positions in the various branches of the health services, and be in a position to put employers in touch with men and women who by training and experience are qualified to fill positions as health officers, laboratory workers, social workers, public health nurses, statisticians, food and drug inspectors, epidemiologists, industrial hygiene workers, milk inspectors, etc.

With this in mind a letter has been addressed to all members of the Association acquainting them of the formation of this Bureau and inviting them, if they so desire, to register. A second letter is to be sent to as many potential employers as possible so that they may be stimulated to call on the office of the Association for lists of qualified persons when they have vacancies or new positions to fill.

Frankly this Employment Bureau is experimental in nature, but if members and employers will coöperate and give the plan a try out it can shortly be determined whether such a Bureau fills a need or not.

MALARIA AS A PUBLIC HEALTH AND ECONOMIC PROBLEM IN THE UNITED STATES.

JOHN W. TRASK,

Assistant Surgeon General, United States Public Health Service.

Read before the General Session, American Public Health Association, Cincinnati, Ohio, October 27, 1916.

Malaria constitutes one of the big national health problems, and because it is a common disease, it receives less consideration than many other diseases less destructive. Doctor Trask here discusses the past and present distribution of this disease and the necessity for an organized fight against it.

IT IS human nature to fear the unusual and the unknown. Few give due attention to the commonplace affairs with which they have become familiar. An exotic disease which threatens invasion or an occasional malady of which little is known will arouse a general interest, while ailments which are widely prevalent and are thoroughly understood receive the most meager attention. Plague, leprosy, or typhus fever arouses to instant activity the press, the people and the health authorities, while commoner diseases, though more destructive, receive far less consideration.

The purpose of health departments is to promote the welfare of the people by securing them against unnecessary exposure to disease. Their duty is to prevent the preventable conditions which produce disease. It would seem logical then to devote first attention to the conditions which our present knowledge shows to be surely preventable, and of these, primarily to those which offer the fewest obstacles to control. If, of such disease-producing factors, we have any which at the

same time are affecting large numbers of people, they would seem to demand our first efforts. Malaria is a disease produced by such conditions.

To fear death and the diseases associated with death and to give less consideration to the ailments which are not directly mortal, are common characteristics. Malaria is not commonly a terminal condition associated with death, and has aroused little of the interest usually associated with more directly fatal morbid processes.

It is not commonly realized that each attack of disease does some injury to the human machine, leaves some organ weaker than it was before and lessens the time during which the body can continue to resist the destructive agencies in its environment. The terminal illness is not usually the one which has been the deciding factor in determining the individual's length of life. It is frequently but the last inimical process to attack a weakened human organism, an organism exhausted and with diminished resistance as a result of previous diseases and morbid processes. Malaria.

is a potent factor in determining the average duration of life in areas where it is endemic. This influence is not only one directly affecting the individual, but it also has its effect on the offspring. A mother suffering from chronic malaria cannot satisfactorily nurse her child. Nor will the child have had the same prenatal advantages as the offspring of a healthy parent. Then, too, a malarious father will not be so likely to furnish a suitable economic status for the family. Malaria is not alone a health problem. It is equally an economic problem, which merits consideration aside from its relation to health.

FORMER PREVALENCE.

At one time malaria was endemic over a much greater area of the United States than it is today, and in many sections where it is still endemic its prevalence has greatly diminished. Fifty years ago the disease prevailed farther north than it does now. The endemic area extended to the great lakes and into Canada. Ague was in this section the most common of ailments and quinine the most universal of household remedies. The early literature indicates that the disease was formerly more or less prevalent also in Iowa, Minnesota, the Dakotas, Utah, Colorado, Montana and Wyoming.

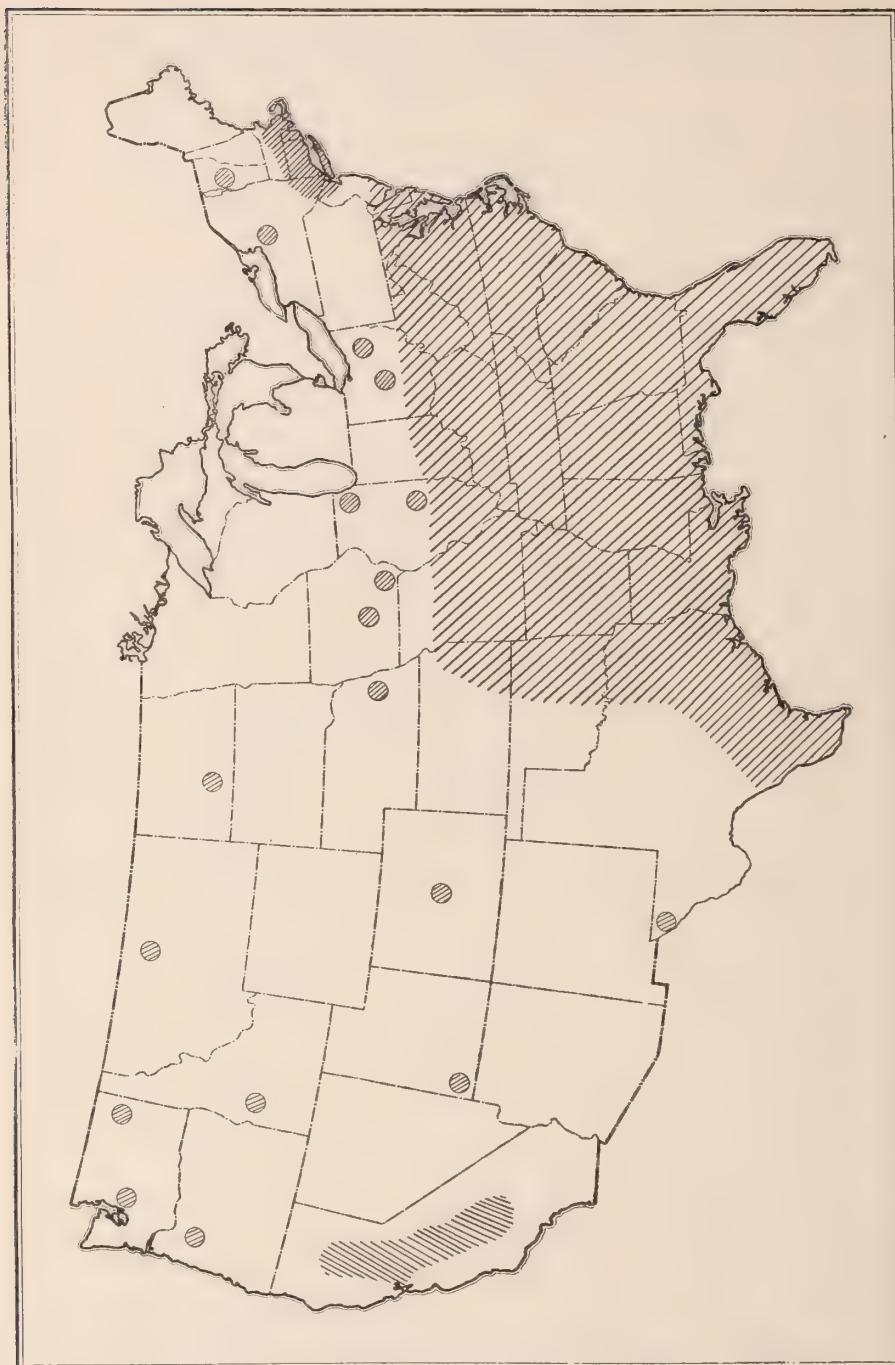
The northern boundary of prevalence has gradually receded, leaving here and there more or less localized endemic foci. Why it has disappeared from large areas and clung to certain localities is largely a matter of conjecture, although a careful study of

conditions would probably explain the apparently perplexing phenomenon. It would be of interest to explain satisfactorily why it has all but disappeared from Wisconsin and Michigan, two states at one time badly infected, and still persists in certain sections of New England. The underlying reason for the recession of the northern boundary of endemicity is probably that, other things being equal, the conditions necessary to the perpetuation of the disease are found increasingly favorable as one approaches the equator and the disease is disappearing first from the localities where the climatic conditions are the least favorable to it.

Malaria is also diminishing in many localities of the south. The reasons for this, given by Doctor Carter, for one locality and based upon personal observation, were: (1) The improved economic status of the farmer, which made possible better housing and a better environment generally. (2) The more extensive cultivation of the land, with the consequent better drainage and fewer collections of standing water in which the mosquitoes can breed, and the cleaning of brush and other wild growth in which the mosquitoes find shelter. (3) The more general use of quinine, which has become a household remedy and is taken freely in all cases with chills or fever as well as for other symptoms of illness.

PRESENT PREVALENCE AND GEOGRAPHIC DISTRIBUTION.

The impossibility of knowing the prevalence or virulence of a disease in the absence of the systematic re-



ENDEMIC AREAS OF MALARIA.

Shaded portions of map show endemic areas. Shaded circles represent localities in which cases of malaria occur and in which the disease is probably endemic.

porting of cases or the making of intensive sickness surveys of the population is especially well illustrated in malaria. There are few diseases to which health departments have given so little attention. Seven years ago letters were sent by the United States Public Health Service to the health departments of the states in which malaria was supposed to be most prevalent, asking for information as to the distribution of the disease in the several states, but the information was not available. The same lack of information has been in large measure true of cities. Health departments as a rule do not come in contact with malaria, and to them the disease seldom projects itself as a problem. In a population heavily infected with malaria a few cases of smallpox cause immediate measures for control, while the malaria is entirely ignored although usually of far greater import.

Nor is the opinion of the practicing physician as to the prevalence of the disease in a locality much better than that of the health department, although he comes into direct contact with cases and might be expected to know existing conditions. Assistant Surgeon General H. R. Carter, in reporting on an investigation of a particularly malarious locality in the south, stated:

" . . . At no place was I able to obtain any definite statistics as to the prevalence of malarial fever there, not even as to its comparative prevalence or its virulence. Each physician had an impression that it was 'much' or 'little,' 'less than' or 'more than,' or 'about the same as' the last

five or ten years. It was 'not very malignant' or 'showed many bad cases' in the opinion of different men. I could not determine the number of cases, even approximately, in any community. . . ."

Also, in speaking of his observations of the prevalence of the disease in a section of North Carolina, a locality probably typical of the areas where the disease is most prevalent, Carter described the conditions as follows:

"In the absence of statistics I can only say that there is much malaria in eastern North Carolina, mainly of a rather mild type, tertian, but there is some estivo-autumnal. There is some in every town I visited, generally in proportion inversely to its size, but varying, of course, with its environment. There is much more in the country, and of severer type, than in the towns. In days not long gone by there was a large amount of extremely severe malaria in this section, not less than there was in the Canal Zone, and there is from report not a little now, especially blackwater fever and malaria of the cerebral type, in some rural districts and villages.

"In most districts in the tidewater region but few people living in the country can attain the age of, say, 30 years, without malarial attacks enough to acquire a high degree of immunity, like the natives on the Isthmus and other malarial localities. Those who did not attain a fair degree of immunity would probably not attain adult age. The prevalence of malaria, then, is most injurious to children, who are, of course, newcomers, during the time they should be getting

their growth and education, and it gives them a permanent handicap in life."

Anopheline mosquitoes capable of spreading malaria are to be found in all sections of the country from the Canadian to the Mexican borders and from coast to coast.

The Public Health Service has for the last four years circularized the physicians of most of the southern states to ascertain as definitely as this means would allow the prevalence of the disease. To determine the geographic distribution of the disease elsewhere, recently circular letters of inquiry were sent to the health departments of all the other states and of cities of over 10,000 population. The records of the occurrence of malaria at army posts were also consulted. The mortality records of the registration area for deaths were examined but gave little information of value for the reason that malaria may be prevalent without appearing in the records of deaths. This is illustrated by the fact that between 1904 and 1914 there were in the army in the continental United States, exclusive of Alaska, over 13,000 cases of malaria while during this time there were only two deaths due to the disease. Between 1907 and 1914 there were over 7,000 cases without a death. Then, too, in civil life malaria frequently is given as a cause of death when the deceased was affected with some other condition and not malaria. This is true both in malarious localities and in localities where the disease does not exist. And as malaria appears comparatively infrequently in mortality

records at most, it is impossible by this means to separate malarious from nonmalarious localities.

As to the geographic distribution of malaria in the United States at the present time, there are three principal well recognized endemic areas, one large area and two smaller ones. The large endemic area covers the whole southeastern portion of the United States, having for its southern boundary the Gulf of Mexico; for its western boundary, a line drawn from Eagle Pass on the Rio Grande to Leavenworth, Kansas; for its eastern boundary, the Atlantic seaboard; its northern boundary, a line drawn from Leavenworth, Kansas, eastward some distance north of the Ohio River and extending to the Atlantic on a line with the northern boundary of Maryland. Of the two smaller endemic areas, one includes a section of the northern part of New Jersey, southeastern New York, Connecticut, Rhode Island and part of the state of Massachusetts. The third recognized endemic area is in California, and includes the Sacramento and San Joaquin valleys, which occupy a large portion of the central part of the state. It is probable that the New England endemic area actually extends southward to the large southern area of which it is in reality a part.

As indicated by reports received from state and city health departments, and the records of army posts, there are lesser endemic areas scattered here and there in many other states (see map).

The records of the army posts are not without interest. Fort Washing-

ton, Maryland, had for several years up to 1913 the highest malaria sick-rate of any post in the United States. The admission rate varied from 736 per 1,000 mean strength in 1906 to 172 per 1,000 in 1912. In the annual report of the Surgeon General of the Army for the year 1911, in referring to the conditions at Fort Washington, it was stated that the malaria rate at this post was higher than that of any post in the Philippines garrisoned by white troops, except Camp Stotsenburg.

While the malaria rate in the army has steadily declined during recent years, it is suggested the cause is the improved conditions at the posts, better barracks and greater attention to screening and drainage, also that the troops still suffer from infection in localities surrounding many of the posts.

In 1914 the highest malaria rate at any army post in the United States was 73 per 1,000 mean strength at Washington Barracks in the District of Columbia. The second highest was at Fort Myer, Virginia, just outside of Washington, and the third highest at Leavenworth, Kansas.

EPIDEMIC AT GREENWICH, CONNECTICUT.

With reference to the endemic area in New England, Dr. Fritz Carleton Hyde* reported what he termed an epidemic of malaria occurring at Greenwich, Connecticut, in 1912. Malaria has been endemic in Greenwich and neighboring localities for

many years. During the first eight months of 1913 two hundred cases of malaria were reported to the health department and a house to house canvass resulted in finding 400 persons who stated they had had malaria during the previous year. The disease was one of the common ailments encountered by physicians in their practice. The tertian type seemed to be the only form present as shown by blood examinations. The impression was that malaria had not been nearly so prevalent for many years and its prevalence was quickly lessened by the clearing up of mosquito breeding places. The disease, however, remains endemic in this and adjoining sections of New England.

ECONOMIC IMPORTANCE.

In localities where malaria is endemic, large numbers of people are likely to become infected, sooner or later. Many become infected year after year, and in some the disease becomes chronic. Infected individuals have their efficiency impaired, as parents, as workmen, and as citizens. Infected workers lose more or less time because of the disease and are less satisfactory workmen. While it is true that in endemic localities adults frequently develop an immunity, this is done at the cost of infections endured during childhood and youth, when the effects are a serious handicap to proper physical development and education. A malarious population may therefore be expected to be physically and educationally subnormal according to the degree of prevalence of the disease.

*Hyde, Fritz Carleton, *Am. Journ. Tropical Diseases and Preventive Medicine*, Sept., 1914, p. 199.

The economic importance of the disease is well brought out by a report of von Ezdorf* on conditions at a mill town in an endemic area. The health officer of the town who had been employed by the mills to render medical services to the employees and their families stated that 75 per cent. of the people in the town had malaria during the summer of 1910, and that its prevalence during 1911, 1912, and 1913 was as great. As a result of the excessive prevalence of this disease, people were coming and going, so that it was estimated that 50 per cent. of the population were in a sense transients. Mills were operating short-handed much of the time during these years. The medical services in attending the sick suffering from malarial fevers became quite arduous, so that during the four months of June, July, August, and September, 1913, visits on account of malaria alone averaged 50 per day. At times there were three, four, and even as many as seven members of a family suffering with malaria at the same time.

In October, 1913, a house to house canvass of four blocks was made, and of 500 persons, 233 reported having had chills and fever during the preceding five months. The blood of 400 persons was examined and the plasmodium found in 55 or over 13 per cent., approximately one in every seven examined.

Measures were inaugurated to get rid of mosquito breeding places and the use of quinine was encouraged. A

year later the town was again visited and the blood of 780 persons examined. Of these only 35, or 4.5 per cent., showed infection. The health officer reported that his visits among the mill employees for several months had averaged not over one a day and that many of these were undoubtedly old infections lasting over from previous years. The malaria rate had continuously decreased during the months when it was usually at its worst. The health officer in his report for 1914 stated that while during the summer of 1913, prior to antimalarial work, the mills were constantly short of help on account of the large number of employees sick with malaria, during the summer of 1914 there had not been a day when the mills did not have sufficient help. The manager of one mill stated that the improvement in the regularity and efficiency of the employees had been such that the amount of \$1,000, which the mill had contributed to the fund for antimosquito work, was more than regained in one month's operation. During the succeeding year very few cases of new infection were found, although a number of chronic infections persisted. In October, 1915, the examination of the blood of 968 persons showed only 3.5 per cent. infected, while the blood of 30 persons living in surrounding uncontrolled territory showed 6 infections. At this time the manager of one of the mills, previously mentioned, wrote:

"I will frankly admit that I could not realize what a great change could be brought about by systematic work and with comparatively little ex-

*von Ezdorf, R. H., *Demonstrations of Malaria Control*, *Public Health Reports*, March 10, 1916, pp. 614-629.

pense. The money spent in anti-malarial work here has paid the quickest and most enormous dividends I have ever seen from any investment, and after having had our experience I would, if necessary, do the work over again if I knew it would cost ten times the amount. . . . Our experience has taught us that the eradication of mosquitoes is not only the proper thing to do from a strictly health standpoint but it is an exceedingly profitable thing to do."

CONCLUSION.

In conclusion, the malaria situation in the United States may be summed up as follows:

(1) In the territory extending from the Gulf of Mexico to a line north of the Ohio River and from the Atlantic seaboard to and into the eastern part of Kansas, Oklahoma, and Texas, few, if any, localities are entirely free from the disease. In most of the low-

lands it is very prevalent, in the mountains and better drained areas less prevalent.

(2) The disease is endemic in southeastern New York and parts of Connecticut, Rhode Island and Massachusetts, and in California in the Sacramento and San Joaquin valleys.

(3) Perhaps there is no state in the Union in which the disease is not present and in which it is not spread by mosquitoes grown locally.

(4) The disease constitutes one of the big national health problems. It is also an economic problem of importance.

(5) The actual geographic distribution of the disease and its relative prevalence can be definitely determined only by making painstaking malarial surveys or by requiring cases to be reported to the health authorities and the authenticity of the reports verified by blood examinations.



THE CLINICAL THERMOMETER AS A CARRIER OF INFECTION.

L. Martocci-Pisculli calls attention to the danger of conveying infection from one patient to another by means of the clinical thermometer. Many physicians content themselves with rinsing their thermometers in cold water and then using them on one patient after another. A number of thermometers were taken from various physicians in order to determine whether germs were actually carried in this way and whether they could be recovered and grown in culture media. Several dozen thermometers were examined by competent bacteriologists in the research laboratory of the New York City Department of Health. It was found that all

thermometers taken from patients carry live pathogenic germs and are therefore disease carriers. Washing them in water and wiping them dry in no way destroys the germs or even reduces the danger of carrying infection. Cool water hardens and so fixes the mucus with the containing bacteria on the thermometers. It is absolutely imperative to disinfect the thermometer after using it on a patient. Physicians must either devise some method of disinfecting the thermometer while carrying it in its case, or spend a few minutes in each patient's house to disinfect it.—*Medical Record*, November 28.

THE NEW UNITED STATES LIFE TABLES, THEIR PURPOSE AND WHAT THEY SHOW.

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Read before the section on Vital Statistics, American Public Health Association, Cincinnati, Ohio, October 27, 1916.

SPECULATION on the chances of life and death has been indulged in by writers, artists, and philosophers of all ages. The dominant note characterizing these reflections, particularly in the mediæval arts, is that Death strikes at random, that there is no law in the aiming of his shaft. This belief* is borne out in the Dances of Death which picture the skeleton reaper leading alike the young and old, rich and poor, good man and gambler, in a wild dance to the grave. A fifteenth century painting of a Dance of Death is still preserved on the walls of the chapel of Marien Kirche at Lübeck. In the beginning of the sixteenth century Holbein produced fifty-three designs of the Danse Macabre which express the traditions of this period concerning death. They are pronounced by a high authority to be the first and perhaps greatest satirical moralities known to the modern world.

Death is pictured in various forms, all more or less hideous and fantastic. A famous fresco in the Campo Santo, Pisa, "The Triumph of Death," dating back to the middle of the fourteenth century, depicts Death as an old hag with bat-like wings about to descend

upon a company of youths and maidens, who, in the enjoyment of music and love, are quite unaware of the grim presence. Throughout this painting, rich in subjects and details, the moral is to prepare for the unexpected coming of Death, by a life of meditation and good deeds rather than to indulge in the selfish pursuit of worldly pleasure.

The same thought runs through the greatest of the morality plays, *Everyman*, which is assigned to the latter half of the fifteenth century. When "Dethe" appears unexpectedly to *Everyman*—"O, Dethe, thou comest when I had thee leest in mynde!"—he is deserted by all his friends except "Good Dedes." *Everyman*, when advised by "Dethe" that he "must take a longe journey" implores in vain for respite—

O wretched caytyfe, wheder shall I flee,
That I myght scape this endles sorowe?
Now, gentyll Deth, spare me tyll to morowe,
That I may amende me
With good advyement!

DETHE

Naye, therto I wyll not consent,
Nor no man wyll I respyte;—
But to the herte sodeynly I shall smyte
Without any advyement.

In more recent times music has contributed through Kastner a remarkable treatise on "Les Danses des

*Karl Pearson dwells on this theme in his essay on "The Chances of Death."

Morts" and Saint Saëns gave to the world the beautiful and mournful symphonic poem, the "Danse Macabre."

The English bills of mortality, which correspond to our death certificates, first appeared about 1538, but the age at death was not stated on these bills until as late as 1728. This would indicate that little importance was attached to the age at death and may be regarded as consistent with the notion that it was a random distribution with respect to age as well as social condition.

The idea of blind chance in the hand of Death probably persisted in the minds of the masses throughout the last century. This is reflected in the almost universal practice of guilds and societies of the working classes of collecting equal dues of all, without regard to age, for insurance protection or funeral benefit, in the event of death.

It was not until the end of the seventeenth century that Edmund Halley, the distinguished English astronomer and mathematician, prepared the first life table, and showed that the law of averages, not pure chance, governed the steps in the weird dance of death. This result was presented to the Royal Society in the form of a paper entitled "The Degrees of Mortality in Mankind," and published in the *Philosophical Transactions* in 1693. This table has since been known as the Breslau table; no English records being available at this time, it was based on the records of 6,193 births and 5,869

deaths in the city of Breslau in Silesia during the five years 1687 to 1691.

I have often wondered if Addison's *Vision of Mirza*, which appeared in the *Spectator* in 1711, eighteen years later, was not inspired by Halley's Breslau life table. This remarkable allegory presents a most striking picture of the march of human life, of the dance of death. Mirza, the prince, is led to the highest pinnacle of a rock near Bagdad by the genius, where the following colloquy takes place:

"Examine now," said he, "this sea that is thus bounded with darkness at both ends and tell me what thou discoverest in it."

"I see a bridge," said I, "standing in the midst of the tide."

"The bridge thou seest," said he, "is human life; consider it attentively."

Upon a more leisurely survey of it, I found that it consisted of three score and ten entire arches, with several broken arches, which added to those that were entire made up the number about an hundred. As I was counting the arches, the genius told me that this bridge consisted at first of a thousand arches; but that a great flood swept away the rest and left the bridge in the ruinous condition I now beheld it.

"But tell me further," said he, "what thou discoverest on it."

"I see multitudes of people passing over it," said I, "and a black cloud hanging on each end of it."

As I looked more attentively, I saw several of the passengers dropping through the bridge, into the great tide that flowed underneath it; and upon further examination, perceived there

were innumerable* trap-doors that lay concealed in the bridge, which the passengers no sooner trod upon, but they fell through them into the tide and immediately disappeared. These hidden pitfalls were set very thick at the entrance of the bridge, so that throngs of people no sooner broke through the cloud, but many of them fell into them. They grew thinner towards the middle, but multiplied and lay closer together towards the end of the arches that were entire.

There were indeed some persons, but their number was very small, that continued a kind of hobbling march on the broken arches, but fell through one after another, being quite tired and spent with so long a walk.

In the Vision of Mirza the delightful contributor to the *Spectator* has given us the first and most entertaining description of a life table. It is free from technicalities and unblemished by the presence of a single statistical fact. To convert it into a modern life table and make the transition as easy as possible, I will merely add that in this bridge of human life each span or arch represents a year, and the throng or multitude entering upon the bridge is usually taken as one hundred thousand. The life table then shows in cold figures the number of passengers who fall through the concealed trap-doors in each span or age interval, in other words, the number of survivors at each age out of

100,000 persons born alive. Upon this fundamental information is built up the entire structure of the modern life table.

This year the Bureau of the Census issued the first publication devoted exclusively to life tables; it appears under the title† "United States Life Tables: 1910," and contains twenty-five life tables prepared under the supervision of Professor James W. Glover, of the University of Michigan. Similar tables have been published from time to time in England, France, Germany, Sweden and other countries; in some cases these tables date back over a century and tables based on statistics collected during the period 1850 to 1900 are quite numerous.

The new United States life tables are based on the census enumeration of 1910 and the mortality statistics of 1909, 1910 and 1911, in the original registration states, consisting of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Indiana and Michigan, and the District of Columbia.

The first table is for both sexes in the original registration states; it is fairly representative of mortality conditions prevailing in this country because it is based on over twenty-four million enumerated lives and one million reported deaths. The next fourteen tables are for males and females, respectively, in the following classes in the original registration states: aggregate, white, negro, native white, foreign white, cities, and rural.

*Pearson, in "The Chances of Death" pictures the bridge of life and in place of the concealed trap-doors introduces five skeleton marksmen who shoot down the passengers in accordance with the distribution in five frequency curves whose resultant he conceives to represent approximately the law of human mortality.

†A copy may be obtained free by writing to the Director of the Census, Washington, D. C.

Finally, ten tables appear for male and female, respectively, in Indiana, Massachusetts, Michigan, New Jersey and New York.

The preparation of a life table from the census and mortality statistics is like striking a balance in a set of accounts. Only through the life table can one know at each age the mortality rate, expectation of life, and annual death-rate in the community. Crude rates may be quite misleading; for example, a pioneer community including an excess of young persons might show a lower annual death-rate than another community in which there is a preponderance of older people, and it might be inferred that the first group was enjoying a more favorable mortality rate. A life table based on the same data might show that in the first community the mortality rate was actually higher at every age than in the second.

The United States life tables are intended chiefly as a source of information for the public and to this end are presented in simple form, with detailed explanations and numerous examples illustrating their use. Apart from this general purpose they are expected to serve as a source of reference to public health officials, students of vital statistics, and physicians. Statisticians, actuaries, sociologists, economists, and writers on public health will find much useful material for consideration, discussion and interpretation.

Life tables are frequently used in legal practice in cases where the value of a life annuity is needed to fix the

measure of damages; the value of the expectation of life is also required very often. They may also be employed in the valuation of reversions, retirement funds and old age pensions. The tables which have heretofore been employed have too often been based on statistics not applicable in this country. It is well known that the Northampton table based on English experience exhibits mortality rates altogether too high and annuity values correspondingly too low. Other tables employed have been based upon insurance experience involving selected lives. The present tables will in most legal cases be found better adapted to conditions in this country.

A detailed comparative study of mortality in different classes of the population is made possible through the life tables, and raises numerous important questions which deserve the most careful consideration. Among the larger questions a few may be mentioned here. The excess of city over rural mortality is so great that the attention of health officials should be given to this subject without delay to determine its cause and to what extent it is practicable to reduce city mortality to the minimum actually existing in the country. To give an idea of the difference, the tables show that out of 100,000 rural male births 58,117 survive to age 60 while among the same number of city births only 43,454 survive to this age. In other words 14,663 more men out of the same number of births, 100,000, would attain to age 60 in the country than in the city on the basis of existing mortality rates. These figures are so

astounding that they deserve the utmost prominence. Similar differences exist in England and Germany as shown by recent life tables. The tables show that the mortality rates among women are lower throughout the entire range of life than for men and that the expectation of life of women is much greater. While this is true in general there is a striking exception in the case of rural women. It appears from the tables that from ages 20 to 40 the mortality rate for rural women is almost as great as that of the men except from ages 25 to 31 where it is actually greater. The same thing occurs in the case of negro women from ages 10 to 20. It would be interesting to know what is the cause of these curious exceptions.

There is considerable interest at the present time in occupational mortality, particularly in the manufacturing industries. The life table for Massachusetts exhibits approximately occupational or industrial mortality as compared with that exhibited

by a state like Indiana which is largely rural. The industrial mortality is greatly in excess of that in the rural communities.

The infant mortality tables contained in this publication offer an excellent opportunity for a comparative study of infant mortality in different classes of the population.

In all these studies the question naturally arises whether the differences exhibited in mortality rates are due to racial characteristics and not easily changed or whether they are due to environment and mode of living and admit of improvement.

Is it possible to attain approximately as favorable a mortality for all classes as the actual minimum now existing for rural men and women? The answer to this question is of more profound significance to the people of this country than any other now before it. I predict that the day is not far distant when the leaders in action in our national affairs will rise to a recognition of its importance.



DEATHS BY FIREARMS IN THE UNITED STATES DURING 1915.

The Census figures bring out the astonishing fact that during the year 1915 firearms caused more deaths than railroad accidents, more than five times as many as street-car accidents, nearly as many as railroad and street-car accidents combined, and more than twice as many as automobile accidents. The total number of deaths due to the use of firearms in the registration area in 1915 was 7,994, corresponding to a rate of 11.9 per 100,000. Of these deaths, 3,608 were suicides, 2,885 were homicides, and 1,501 were accidental (including

those concerning which the status as to suicide, homicide, or accident was in doubt). The suicidal use of firearms has increased from year to year since 1913; the frequency of accidental deaths due to their use shows a slight decline during recent years; and the homicidal use of firearms shows a decline as compared with 1913 and 1914 but an increase as compared with 1910, 1911, and 1912. No separate data as to homicides by firearms for the years prior to 1910 are available.

PATHOGENICITY AND LONGEVITY IN DIPHTHERIA BACILLI.

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THE work to be described has been done with the object of obtaining some facts which would give a satisfactory basis for answering some of the following questions.

(1) "Considering bacteria of the same species, have those which exhibit the greatest resistance to germicidal action a corresponding increase of pathogenic power over their fellows which succumbed?"

(2) "Or, are the few which survive exposure to detrimental conditions for long periods practically innocuous?"

These questions have frequently been answered by the theorist, but satisfactory experimental work for which reliable conclusions can be deduced has not in our knowledge been done.

An endeavour has been made to throw some light on the relationship existing between pathogenic powers and anti-bactericidal power of certain micro-organisms. The question is of interest and of importance from a public health standpoint.

It is known that when large numbers of bacteria are uniformly exposed to the action of a bactericide, that some show greater powers of resistance than others and will survive for a greater or less period of time.

The few which survive this trying

ordeal have been referred to as "huskies," intimating that unusual power of resistance was associated with unusual physical vigor.

Have the surviving minority pathogenic powers as potent as the members of the same strain that were weaker and thus destroyed? Or, do the increased powers of resistance exist at the expense of pathogenic qualities? Or, lastly, is increased resistance the concomitant of increased infectivity? The work here reported if not definitely answering such questions will, at least, bring before us some interesting facts along these lines.

Before giving details of each experiment a general outline of the work had better be given.

The only organism worked with at present has been the diphtheria bacillus, for the reason that fairly accurate virulence tests can be made with comparative ease.

The first procedure was to obtain a pure culture of *B. Diphtheria*, from a clinical case. Isolation was not difficult by making tube dilutions on Loeffler blood serum and fishing from the most suitable.

The culture used in the experiment was almost always the first culture on blood serum from colony fished.

From the culture special broth was inoculated, and incubated at 37°C. for twenty-four hours. For this work

the broth was put up in large quantities in test tubes, each containing 10c. The same batch of broth was used from beginning to end of experiments.

Formula for Bouillon:

Infusion of Veal.....	1000 grms.
Peptone.....	20 grms.
Sodium Chloride.....	5 grms.

Method of preparation is the same as for ordinary nutrient bouillon. Reaction is made alkaline to litmus, after the media is made neutral to this indicator 7c.c. of a 10 per cent. Sodium Hy. Soln. is added.

After twenty-four hours' growth, the culture was well shaken and a definite quantity injected into a guinea-pig, the quantity varying with the weight of the pig. The animal was now watched and time between injection and death recorded. Cultures were then made from the site of injection and internal organs.

From the same culture used to inoculate the broth, several snugly wrapped cotton batting swabs were freely inoculated and replaced in their respective sterile test tubes.

Some of them were placed in the sunlight and others in the dark.

The swabs exposed to the sunlight were placed on a table in the middle of a conservatory, the roof and three sides of which were made of heavy wrinkled glass. The room was an exceptionally light one.

Swabs placed in dark. They were placed in the dark corner of a cupboard. The light was not entirely excluded as the cupboard had a glass front. But it compared favorably

with a dark corner in a living or bedroom. At different intervals Loeffler's blood serum tubes were inoculated and incubated to ascertain whether there were still organisms capable of growth remaining on the swab. Early cultures made from such swabs would naturally give a very heavy growth, within twenty-four hours. But after longer exposure, such cultures would give but a very scanty growth of a few colonies which could not be seen till after twenty-four to forty-eight hours' incubation. This delay in growth was not recognised at first, so that if in twenty-four hours no growth could be seen, the blood serum tubes were re-incubated with their respective swabs. After eighteen hours' further incubation a luxuriant growth was generally present. This led to the erroneous idea that probably only a few organisms had been left on the swab, these during the first incubation had produced one or two microscopic colonies which the second inoculation had spread and the later incubation increased. No estimate of the original number of colonies could be obtained when second attempts at inoculation were made on the same tube. This knowledge was not gained till the first experiment had been made so the organisms used in the second animal inoculation of this experiment were not as ideal "huskies" as they might have been.

Frequently when no growth can be detected with twenty-four hours' incubation, a further period of twenty-four hours will reveal the growth of numerous colonies.

This tardiness of growth even when

optimum conditions of artificial growth are offered is interesting, possibly giving us some idea of what may happen in natural infection with similarly attenuated organisms.

Should such weakened organisms reach the naso-pharyngeal mucosa, factors whose influence are but vaguely known come into play so that one can but surmise as to the final outcome. Conditions making infection favorable or otherwise undoubtedly will vary in individuals and in the same individual from day to day.

One must remember to discard a swab that has been twice used to inoculate a serum tube, as fresh inoculation of the swab would occur from any bacterial growth resulting from the first twenty-four hours' incubation.

It may also be mentioned, that pure cultures must be used on the swabs. The reason being that such organisms as *S. aureus* contaminating the swabs will outgrow the diphtheria bacilli during the first twenty-four hours and thus make isolation of the latter impossible. Its recognized faculty of rapid growth is lost when much attenuated.

The following experiment is given in detail to illustrate the method employed in the eleven experiments summarized below.

EXPERIMENT 1.

The organism used in this experiment was obtained from a swab sent to the laboratory, suspected diphtheria.

July 19—Obtained by tube dilution on Loeffler blood serum in pure culture. Morphology, granular bacillus, irregular in shape. Special

broth was inoculated from the culture and incubated for twenty-four hours at 37°C. An endeavor was made to make as uniform in quantity as possible that amount of culture added to the broth in each case by the use of the same platinum loop.

July 20—Broth shows granular turbidity with no pellicle, stains show pure Klebs Loeffler Bacilli granular; shaken thoroughly; three pigs were injected with following amounts, .15 c.c., .25 c.c. and .35 c.c. The two receiving the last mentioned dose died in forty-eight hours, the former receiving .15 c.c. died in four days (wt. = 360 grms.).

July 20, p. m.—At site of injection the K. L. B. was recovered, solid forms were the commonest. Blood was negative, supravental gland was somewhat congested but cultures were negative.

July 19—Good firm cotton batting swabs were inoculated from the pure culture, and placed carefully in test tubes so that their surfaces did not contact, and thereby exclude light. The same were now placed some in the sunlight and others in the semi-darkness.

Swabs placed in light—On a table in the middle of a conservatory, the roof and three sides of which were made of heavy wrinkled glass, the room was an exceedingly light one.

Swabs placed in dark—These were put in the dark corner of a cupboard. The light was not entirely excluded from them as the cupboard had a glass front, but it would compare well with a dark corner in a living or bedroom.

July 26.—Swabs were removed from these places and in blood serum inoculated.

July 27. *Swabs from light*—All showed growth but colonies were small and not numerous, had a dry appearance.

Stain—Loeffler's Methylene Blue, slender and granular, morphology variable.

Ten c.c. of the original special bouillon was inoculated with a loop smeared from this culture, and incubated for twenty-four hours at 37°C. At the end of this time the tube had a coarse turbidity. Purity tests were made and proved satisfactory.

Aug. 12—A guinea-pig (wt. 550 grms.), was given a subcutaneous injection of 3 c.c.

Aug. 13—Sick, died during night.

Aug. 13, p. m.—The organism was recovered in pure culture, from site of injection which

showed considerable inflammation and exudation. The conclusion to be drawn from this case seems very evident, *i. e.*, that the progeny of the surviving organisms were equal in pathogenic power, with their deceased progenitors.

Aug. 23—Swabs from dark cultured on blood serum.

Aug. 24—No visible growth so the swabs were rubbed over the surface of their respective tubes and re-incubated.

Aug. 25—No growth on one tube, the other showed well marked and characteristic growth.

Aug. 26—From the culture bouillon was in-

oculated, after twenty-four hours' incubation marked turbidity was observed.

Aug. 27, 4 p. m.—2 c.c. was injected subcutaneously into a guinea-pig (wt. 350 grms.).

Aug. 28—Pig ill. Died during the night, about thirty-six hours.

Aug. 28, p. m.—Site of injection showed acute inflammation, cultures gave good growth of K. L. B. Blood cultures negative.

The following table gives a summary of the results obtained in eleven such experiments:

SUMMARY IN DIPHTHERIA RESEARCH.

No.	Morphology and staining. Time of isolation.	Pathogenicity. Time of isolation.	Pathogenicity. After desiccation (light).	No. days survived light.	No. days survived dark.	Final morphology and staining.
1	Irregular. Barred and meta- chromatic.	.3c.c.-360 grms. 48 hrs. .15c.c.-360 grms. 96 hrs.	.3c.c.-550 grms. 40 hrs. (21)	21		Irregular. Granular and barred.
2	Irregular. Barred and meta- chromatic.	.25c.c.-360 grms. 48 hrs. .15c.c.-360 grms. 96 hrs.	.2c.c.-360 grms. 36 hrs. (36)		36	
3	Solid and ghost enders.	.2c.c.-280 grms. 50 hrs.	.2c.c.-290 grms. 45 hrs. (40)	27	40	Barred and ghost enders. No sol- id.
4	Solid and double enders.	.3c.c.-350 grms. 120 hrs.	.3c.c.-350 grms. 120 hrs. (35)		35	Solid.
5	Slender, metachro- matic.	.15c.c.-370 grms. 60 hrs.	.1c.c.-280 grms. 80 hrs. (55)		55	Solid, metachro- matic.
6	Hoze enders and ghost enders.	.2c.c.-330 grms. 12 days.	.25c.c.-370 grms. 8 days (30)	30		Hoze enders.
7	Hoze enders and ghost enders.	.2c.c.-330 grms. 12 days.	.2c.c.-340 grms. 8.5 days (46)		46	Ghost enders.
8	Ghost enders.	.2c.c.-230 grms. 48 hrs.	.2c.c.-255 grms. 72 hrs. (40)	27	40	Granular, solid.
9	Mostly granular, some barred.	.2c.c.-280 grms. 40 hrs.	.2c.c.-500 grms. 48 hrs. (60)		60	Large granular ba- cilli.
10	Ghost enders.	.2c.c.-400 grms. 40 hrs.	.2c.c.-520 grms. 50 hrs. (60)		60	Chiefly solid, type A and A1.
11	Small solid, not typi- cal.	.2c.c.-450 grms. not pathogenic	.2c.c.-400 grms. not pathogenic (52)		52	Solid, hoze enders.

Note: Columns two and three (Pathogenicity, time of isolation and after desiccation) record the quantity of broth culture injected, the weight in grammes of the guinea pig infected, and the time in hours that the animal survived the injection.

The small figures in parentheses refer to the age of swab used in making the culture.



During 1915, in Budapest, a city of 1,000,000 inhabitants, there were 21,162 deaths and only 17,825 births. Deaths from tuberculosis reached the exceedingly high rate of 35 per 10,000 population. A typhoid fever death-rate of 65 per 100,000 is reported. One hundred and seventy-five children died out of every 1,000 born.

REFUSE AND GARBAGE DISPOSAL—A GENERAL SURVEY.

LOUIS L. TRIBUS,
Consulting Engineer. New York City.

FOREWORD.

SMALL municipalities are wont to consider the collection and disposal of household, street and nuisance producing light manufacturing wastes, as an evil to be endured, and with a "hold your nose" attitude—gather the material in a more or less desultory and unsanitary manner and get rid of it in some way or other, without regard to efficiency or economy.

Large communities usually have more attractive or more popular projects that take public attention, so act towards this essential municipal function, with rather less consideration than even that given elsewhere.

When the quantities are large enough, longer visioned corporations are permitted to reap a harvest from the money making part of the problem, while the city burdens itself with abnormal and too often unnoticed expense for collection and delivery.

There is but one real side to the subject, *i. e.*—good business, though the one usually overlooked. It may be divided into two main characteristics; viz., Sanitary and Financial; with further sub-divisions as the problems are studied.

SANITARY.

- (a) nature and care of receptacles.
- (b) frequency and method of collection.
- (c) treatment of collections to des-

troy disease and nuisance producing elements.

(d) disposal of resultant products in healthful manner.

FINANCIAL AND OPERATIVE.

- (e) ownership of receptacles.
- (f) municipal or private collection.
- (g) lengths of hauling routes.
- (h) treatment plants.
- (i) management.

Many of these factors bear upon each other in such fashion that choice of some particular method may cause change in others. It is just because of such effects, that the subject for any given place, must be studied with unbiased mind after securing comprehensive knowledge of conditions.

The agent of a special furnace or process, or some particular kind of collection device can not dissociate himself sufficiently from it, to give the most intelligent study to and trustworthy advice upon the main question.

Consequently, those must be looked to for opinion, who to good judgment and common sense, have added careful investigation and actual practice.

The physician—"health officer" will recognize the evils due to unsanitary methods and the advantages accruing from a well solved problem; the city engineer accustomed to a nice balance of cut and fill in his street grades and economical disposition of materials for strength and permanence

in his plans, with an eye even to the esthetic and artistic, does not usually have the actual experience necessary to wise decision in waste disposal cases.

The city manager, with his charts and diagrams, and arrangement of working forces, and willingness to take expert advice on technical matters is rather closer to the heart of the subject, for, if worthy of his position, he is constantly studying to maintain a right balance between the different parts of his work, scientific, practical and financial.

It may safely be stated that neither in the United States or abroad have the problems been solved completely in all their features in any one given city.

Some have reached economy, convenience and sanitary success in one or more characteristics, but have failed in others. At first thought one might say, why not take the different features that have been successful in various places and combine them into a complete success for some particular city.

That is just what numberless cities have attempted to do, following the reports of various officials upon their junketing trips of investigation and the accumulation of reports, suggestions, plans, proposals, etc., from all kinds of sources.

Then the ruling bodies, by that time well saturated with information (biological and financial hash), decide on a scheme, and one more economic crime is launched.

Often sincere are the men who thus act, and none should decry their gathering of information and attempt-

ing to fit themselves for decision and action.

It is impossible however, for officials, having other regular duties of importance, to give such time and attention as shall enable the preparation of the basic plan in so intelligent a manner as to produce final results of efficiency and economy.

Frequently appears the item that Jonestown, Smithlake, Brownsbury or some other well known place, has entered into contract for a garbage incinerator, or a reduction plant, with glory to the officials in charge and profit to the sales agent, but in the unfortunate ignorance of the taxpayers, with continuing annual waste of their money.

Not necessarily waste, so far as the plant's operations go, but waste due to a lack of harmony between collection and disposal.

A few are studying the combined problems and may give good account in results, but until the public is educated up to its own interests, so long will failures continue to develop, though they are not often made public by the unfortunate community, which frequently is ignorant even of the actual fact of failure.

SANITARY.

(a) Nature and care of receptacles.

Decrepit coal scuttles, wooden soap boxes, battered and leaky wash boilers, newspapers, galvanized iron pails, cans with or without covers, and waterproofed tough paper bags, all are found in service.

The generally accepted receptacle for garbage is the heavy galvanized

pail with close fitting cover, but in some few places, the paper bag is added as the lining or actual container.

If used with care it is an excellent one, but its field is practically limited to garbage, for hot ashes would create trouble and their roughness and weight would exceed the strength capacity of the paper.

Galvanized iron cans holding about 100 pounds are standard for ashes. While general rubbish receptacles can not be standardized.

Too little attention is paid by many householders to the cleanliness of the receptacles, and to their being kept tightly covered. They should be frequently washed and scoured so that no putrifying old matter can remain to inoculate the new, and in warm weather be sterilized with strong disinfectants. Any less care will insure the breeding of flies with all their nuisance and danger to health, as well as the development of offensive odors.

(b) *Frequency and method of collection.*

Daily, *i. e.*, six times a week is wise, if population is congested, and is essential to decency, if hog feeding with the garbage follows; many places collect but three times, and a few only once weekly.

If mixed materials are gathered, the longer intervals may pass, from a sanitary viewpoint, so that quantity then determines frequency, because ashes and paper etc., absorb much of the moisture from the garbage to some extent therefore deferring putrefaction.

The one-horse farm box wagon can be often found doing service and the one-horse contractors' wooden dump cart, but more usually in the larger

cities steel bodied water tight dump carts, with or without tarpaulin covers, to presumably hide the unpleasant contents and as some fondly hope, to prevent the escape of odors and dust.

Two-horse four-wheeled bottom dump wagons have been tried somewhat, where the length of haul is considerable, and a few experiments have been made with motor trucks to be loaded with the cans or boxes.

In at least one well known American city two-horse collecting wagons are in service, provided with removable steel bodies, which at an unloading station are removed and stacked on railroad flat cars, for transporting several miles to the treatment works. In some of our other large cities carts collect the garbage and dump it at central stations, into steel hopper cars, hauled daily to the works, or upon barges for water disposal or distant place treatment.

None can say that either of these methods is the best; local conditions and attending circumstances can alone determine, but in general, the shorter the haul between the house or shop and the place of treatment, with the least intermediate handling, the greater will be the efficiency in operation and the lower will be the cost.

(c) *Treatment of collections, to destroy disease and nuisance producing elements.*

From time immemorial, household and municipal wastes have found final deposit in vacant lots and low lying ground, where exposed to sun and rain, partially burned, or covered with ashes or earth and sometimes sprinkled with disinfectants they have gradually

found their way back to their original elements creating nuisance or not in the process, as lack of care made possible or esthetic taste decided.

On a farm, hogs consume the vegetable and animal household wastes, usually in a fresh condition, hence a perfectly unobjectionable process. In a small town with sufficiently frequent collection, the same method is followed without particular detriment, though some of the material could scarcely be thought to be in very choice condition; even for hog food.

For large places, though actually in vogue in several, the practice is condemned by the most progressive sanitarians.

The nature of a population has also much to do with the suitability of method. With rigid and careful separation of garbage, ashes and dry refuse, where quantities are large in the aggregate, it may be wise to treat the garbage for recovery of its grease, ammonia and tannage. The ashes can usually be used for filling, or even be separated to recover their fair residue of good coal; while the other materials can be assorted for sale and the worthless remainders be burned. Corrosive disinfectants, like quick lime, are occasionally used as a temporary treatment, but practically never outside of the tropics and military camps as a general means for destruction.

Treatment by fire is very effective, absolutely sanitary, and successful if conducted intelligently.

Briefly summarized therefore final disposition can be classed as animal,

earth, chemical and fire; each with its own peculiarities, limitations and possible secondary problems.

(d) *Disposal of resultant products in healthful manner.*

From a reduction plant the waste liquors can safely pass in the sewer, without nuisance en route or involving large difficulty in operating sewage disposal works. The grease is extracted, barreled and transported as an inoffensive manufactured commodity; animal hides are salted or crudely tanned and baled for ready handling; tannage is dry, fairly odorless, can be packed in bags and usually be removed in car load lots.

As a general rule such plants are located near a railroad.

From incineration works, nothing of offensive nature exists as a product; power is developed for local use and the slag, bricks, blocks etc., are transported as are other building materials, without offence.

FINANCIAL.

No municipal operation can be considered, no matter how important even from public health standpoint without weighing its financial factors. Here is where so many places completely fail, because most attention is given to that which seems to chiefly interest the public at the time; sentimental objection too often outweighing good business sense.

(e) *Ownership of receptacles.*

Almost universally, receptacles are the private property of the householder, being carried full to the collect-

ing cart and returned empty and foul, to again be filled.

In view of the unsanitary condition that usually so wholly prevails, due to neglect in caring for the emptied receptacles, the plan has been tried, though not on large scale, of removing the refuse in its receptacle and leaving a clean sterilized can in its place. Naturally this tends to municipal ownership of the can, and as a matter of full community economy, such is wise, for, bought in large quantity, the lowest prices can be secured, and under the right kind of supervision, better care would be accorded by the collectors, than they usually give to privately owned receptacles. In the long run therefore this means lower net cost to the taxpayer.

With municipal ownership there should go municipal cleansing.

(f) *Municipal or private collection.*

Unsigntleness and uncleanness have universally gone hand in hand with private collection. If the contracts be made with the individual property owner, extortion and petty graft accompany them; if made with the community, on basis of doing the work for the least sum per year, inattention and skimping the service follow, with more petty graft; if on basis of yardage or tonnage hauled and delivered, every incentive to pad the figures, and to take material not properly collectible.

It is a moot question just what wastes should be publicly removed, and what should be considered "trade" with the cost of removal, included as a factor in the value of the manufactured

article similarly to that of gathering the raw materials.

If general private collection be in vogue, this last problem is of but small import, but if full municipal operation is in effect, particularly in a large city, the item becomes of importance.

The public removal of wastes has grown up from the sanitary side, to free the householder and the small tradesman from the nuisance and expense of removing small quantities of putrescible matters and those having no further household or store use; into one having universal community importance. It has been further adopted as a means of greater net civic economy as well as of health.

With the very rapid growth of the large apartment houses and hotels and development of the department stores, the questions may well be raised; are not the wastes technically of "trade" nature, and therefore should they not be removed at private expense.

Some cities solve the problem by limiting the quantity for daily removal from any one place, more nearly equalizing the expense therefor, but some injustice is inevitable.

Probably the only measure of strict justice would be to require payment of small fixed sums for each can or barrel or cartload of refuse removed, using a ticket system to prevent crookedness of collectors; this is in effect in a few places.

With municipal management the collecting cart, wagon or truck can be more readily standardized and greater cleanliness be controlled. Greater initial expense may prevail, though tak-

ing all factors into consideration, the community will be better off in the long run and certainly is likely to be better served and satisfied.

(g) *Lengths of hauling routes.*

This is a subject solely of local import; no direct comparison between different places can be made to advantage, unless their topographical, geographical and development conditions are identical, which of course is rarely the case.

The ideal is to have the collecting routes start at the higher levels, and proceed downhill to the treatment or disposal centres, with the minimum traction distance for the filled vehicles after leaving the last collection point. The nature of occupancy of the district will determine the quantity of material, therefore the length of haul for each vehicle during loading. Other conditions will somewhat determine the place of treatment or disposal, therefore the total lengths of haul. These conditions fix the daily service of each vehicle, consequently the cost of collection; obviously therefore, if the places of treatment can be at the centres of the producing districts, so arranged that there is the minimum of dead traction, there will follow the maximum collecting efficiency and the minimum of collection cost.

(h) *Treatment plants.*

Each city presents its own characteristics, dependent on geographical location, as to latitude; on topographical position, seashore, river front or inland; and on type of occupancy, residential, business or manufacturing.

There are seasonal variations, not only as to quantity of garbage, ashes and rubbish, but as to their qualities as well. All these factors have bearing on suitable method of treatment and of course the net cost of operation.

There are two practices in plant development which depend largely on contract conditions. If the municipality is to handle its own wastes there is little excuse for the niggardly, which usually means ultimate wastefulness. If a private corporation is concerned the time of contract becomes a controlling factor. With a short term of years, say five to ten with uncertainty as to renewal it would not pay to erect permanent structures, or go to refinements in machinery with the possibility of scrapping the whole, or selling out at a figure so low as to be an almost negligible return.

For this reason discredit has been cast on so many existing systems, and the idea prevails that such conditions must necessarily be unchangeable.

Three main types of plant have been popular or rather have been endured.

The earlier form, burning the garbage and refuse at temperatures under 900 degrees, with almost inevitable escape of noxious gases, smoke and dust. The next, cooking the garbage and extracting its elements of value, usually though not necessarily creating local nuisance, and the third, incineration at high temperature (1,400 to 2,000 degrees Fahr.).

The first mentioned is scarcely considered any longer as a method worthy of adoption.

Under the second it is quite possible

to take raw garbage even in a more or less putrid condition and treat it with live steam in closely sealed receptacles and pass the by-products and residues through stage after stage in practically closed processes, with induced draft ventilation and fire consumption of gases, so that even within the buildings themselves there will be little offense, and outside, practically none at all from the process itself. Unfortunately however most plants are not conducted along such lines.

The third and more recent form is the high temperature incinerator where all classes of collections are burned, without the use of extra fuel and if properly designed and suitably operated, without causing local nuisance of odor, smoke or dust. Such a plant will secure from the fuel value in the ashes and the rubbish, heat sufficient to operate itself and leave a considerable surplus for other purposes. This has been used to operate sewage and water pumping stations, to furnish electric lights and several kinds of small manufacturing.

One of its most valuable properties is the feasibility of erection within the district of collection, practically eliminating excessive haul.

The reduction method has heretofore appealed most to private capital, for a very complete sale of by-products could usually be effected, but as municipalities take over the care of more of their own utilities, the difficulty of making sales to advantage, with the possibility of local utilization of incinerator results, is tending to cause quite extensive consideration of that method.

Using several systems in the same

place is not entirely out of question. The value of the daily wastes to an individual household is slight; the combined collections, aggregate such quantities of many different classes as to be well worthy of recovery and treatment to insure first, sanitary safety, and second, sale for remanufacture.

If the municipality handles the case itself in the most economical manner, all factors considered, there should be a sales or utilization value in by-products from both reduction and high temperature plants to pay for running them and yield some surplus towards the costs of collection.

Obviously collection must represent expense; interest on capital invested, depreciation, wear, and labor.

Grease and tankage have market values of but slight fluctuation; at lowest, they should be more than enough to meet expenses of well regulated works and help towards those of haul.

In incineration plants, steam becomes an available by-product which can be converted into electricity or be used direct for power to pump water or sewage as well as run the works themselves; the slag, in crude shape makes an excellent light filling for swampy lands, or if ground into various sizes, can be used in lieu of stone, gravel, or ashes in concrete for foundation or mass-wall work; if ground quite fine, with addition of cement it makes a fair brick or block for walls not exposed to the weather or to abrasion.

Of course having passed through temperatures of 1,400 to 2,000 degrees Fahr. all noxious matters are completely destroyed.

If proper credit be given to the value of these products, quite a respectable margin above expense will be shown, and a fair balance towards the cost of collection, as in the case of reduction works. Let no one imagine, however, that the combined work of collection and disposal will yield a net profit to the community in any present day system.

In reduction works where the processes have been carried out in the best manner, the dry and ground garbage tankage from which the grease has been extracted makes a fair basic material for land fertilizers, but needs first the addition of other ingredients. The different agricultural companies will however buy it at prices making it worth treatment. The grease chiefly goes to soap companies who are constantly looking for new sources of supply.

Incineration plants do not have quite so wide a field for sale of by-products, but if they are utilized direct, or worked up for other municipal department uses the net return is quite material.

(i) *Management.*

A lack of understanding upon the part of city officials in general has led to such a condition of affairs that they have hesitated to undertake complete municipal management, fearing the criticism following nuisance in operation; also perhaps for less worthy motives, yielding to the importunities of those willing to face the contumely, provided they could secure the undoubted profits in running a disposal plant, while the community stood the expensive features of collecting and delivering the materials for treatment.

The reduction of garbage, so as to produce grease and fertilizer base as the chief elements, offers to corporations the most likely field for operation, so that this has probably accounted in large measure, for the existence of so many reduction plants in the larger cities.

In the past there has been opportunity in most places for the ready deposition of ashes and the burning of light rubbish without creating any large degree of annoyance. Again there is in the collections, much material of real value which will warrant the sale of picking privileges. The municipality itself will not often bother with details, but is usually perfectly willing to unload the responsibility upon a contracting firm and allow it to make what profit there is, and give the semblance of thoughtfulness for the taxpayers by selling the privileges to the highest bidder, with rarely any return of equivalent value.

Unfortunately the output of power in incineration plants is not usually constant, so that unless used to supplement other municipal needs, it can not be sold on terms sufficient to make it a paying enterprise, consequently private corporations are averse to adopting the method.

The foregoing review of refuse handling is suggestive rather than exhaustive, even as to number of topics considered. Full articles could with profit be presented on each of the factors. For general discussion the main points of sanitary efficiency, financial economy and taxpayers' convenience may be emphasized, while the many technical matters may be left to each place to study for itself.

STANDARD METHODS OF BACTERIOLOGICAL ANALYSIS OF MILK.

PROVISIONAL REPORT OF THE LABORATORY SECTION OF THE AMERICAN PUBLIC HEALTH ASSOCIATION.*

Presented before the Laboratory Section, American Public Health Association, Cincinnati, Ohio, October 24, 1916.

SINCE the publication of the earlier Standards in 1910 the demand for this kind of work has grown rapidly. Especially has this been true of the last two years under the stimulus of the demand for the grading of milk. It has become apparent that a bacteriological analysis of milk is required for two very distinct purposes, which of necessity demand different methods.

1. Routine Milk Analysis.—This type of analysis is designed for the general control of the public milk supply and for the purpose of grading of milk. For routine analysis the work must be capable of being done quickly and cheaply, and in such a way as to give the most speedy results possible and by methods having the smallest possible expenditure of time and money, consistent with fair uniformity of result. The demand for rapid methods, with the smallest possible expenditure of time and money, has been forced upon different laboratories in the last few years, and has brought about various short cuts from the standard methods as previously formulated. The necessity for such rapid and inexpensive methods

must be recognized. But it is also evident that they should be made uniform in different laboratories.

2. Research Methods.—That the routine methods as adopted by public laboratories are inadequate to give the kind of results required for research work has also become evident. To use the Standard Methods as adopted for control work will not give a sufficient grade of accuracy for scientific investigation.

In the former publication of Standard Methods these two different purposes were not recognized, since the bacteriological control of the public milk supply had hardly started and no one could anticipate what it might demand.

ROUTINE METHODS OF ANALYSIS.

Collection of Samples.—All collecting apparatus, glassware, pipettes, collecting tubes, bottles, etc., shall be sterilized at a temperature of at least 175° C. for one hour.

Each sample shall consist of at least 10 cc. of milk. Before taking the sample the milk shall be mixed as thoroughly as possible. If the original container can be inverted the mixing of the milk should be done by inverting it several times. If this is impossible, the milk should be stirred with some

*The Committee would welcome suggestions and criticisms from members of the Association during the coming year.

sterile stirrer. Any stirrer already in the container may be used. If there is none in the container, the sampling pipette (or any other sterile article) may be used; but it should be used for one container only until it is again sterilized.

A sample simply poured from a large can is not a fair sample unless the milk in the can be thoroughly stirred. The sample shall be taken from cans by means of a tube with straight sides, long enough to reach the bottom of the original container, and inserted, not too rapidly, with the top of the tube left open. This will result in the tubes containing a cylindrical section of the milk from top to bottom of the can. The finger then placed on top of the tube will make it possible to withdraw the tube full of milk and transfer it to the sampling bottle. The sampling bottle should be large enough to hold the entire contents of the tube, *all of which* must be reserved as the sample. Each tube shall be used for collecting a single sample only, and must be washed and sterilized before it is used again. An aluminum tube of the diameter of $\frac{1}{4}$ inch and 21 inches long is very convenient. If the sample is to be taken from a bottle, the bottle should be first shaken to ensure thorough mixing and then the milk may be poured into the sample bottle, although it is better here also to use a sampling tube.

If the temperature of the milk is desired, it should be taken from a separate sample that should then be discarded. All records shall be made immediately after taking the sample. The milk sample shall be placed in a

properly labelled bottle. The most convenient kind of sample bottles are glass-stoppered, or those closed with a cork-lined screw cap. Cotton plugs are not a satisfactory method of closure. The sample bottles shall be placed at once in a carrying case containing cracked ice, so that the milk is cooled at once to near the freezing point.

The samples shall be transferred to the laboratory as quickly as possible, and shall be plated at once. If the samples can be placed in melting ice and water they may be kept for several hours (12) without an increase in bacteria. If the plates are not made within four hours of the time of collection, the number of hours that have elapsed should be stated on the report. If the milk is kept at 40° F., a slight increase may be found in twelve to twenty hours. Up to twenty hours this will not be more than 20 per cent.

MEDIA.*

Standard beef extract agar shall be used for all routine work. This shall be prepared as follows:

To 1,000 cc. of water add 5 grams of peptone and 3 grams of beef extract. The peptone shall be the best available, and the beef extract shall be Liebig's where this is obtainable. Weigh the containing dish and its contents.

Dissolve the peptone and beef extract by boiling and replace the water lost through evaporation.

* The medium here described is essentially identical with that used as a standard in water bacteriology. The slight differences in method of making make so little difference in the result that the two may be used interchangeably.

While still hot filter through filter paper.

Add 12 grams of oven dried agar, or 15 grams of market agar, and dissolve by boiling, or in an autoclav. Restore the weight lost by evaporation. It is imperative that the agar be of the best quality and *clean*, or it is impossible to obtain a clear medium. (When an autoclav is at hand the following modification is convenient. Add the peptone and beef extract to about 300 cc. of water, and the agar to 700 cc. Heat both in an autoclav under 15 lbs. pressure one-fourth hour. Filter the broth while hot through filter paper, and then mix the broth with the melted agar and filter through absorbent cotton.)

Determine the acidity of the medium by titrating 5 cc., diluted with 45 cc. water, with $1/20$ normal NaOH, phenolphthalein being used as an indicator. Any attempt to adjust the acidity is likely to make undesirable changes in the medium. Inasmuch as variations between $+0.5$ and $+1$. acid make no appreciable difference in the results, the reaction of the medium is not to be changed if it falls between $+0.5$ and $+1$. acid. It will usually be between these limits. If it should be above $+1$. acid, add enough normal NaOH to bring it to $+1$., and if it is below $+0.5$ acid add enough normal HCl to bring it to $+0.5$, always adding the smallest amount of the reagent possible to bring the reaction within these limits.

Cool to 45° C. and then heat to boiling (15 minutes) and filter through filter paper or absorbent cotton. It is necessary that the filtering be contin-

ued till the medium is clear. If the procedure here given is followed and a high grade of agar and other materials is used, there will be no difficulty in getting the agar clear. Egg should not be used as a clarifier.

After filtering the agar may be either tubed, 10 cc. in each tube, or placed in flasks containing about 150 cc. each. The latter method requires less glassware and less time, and is found to be equally satisfactory for plating as explained below.

Sterilize in an autoclav at 15 lbs. pressure (never above) for one-half hour, after dry steam comes from the autoclav. As an alternative the medium may be sterilized on three successive days in streaming steam, in which it must remain 20 minutes each day after the agar has completely melted.

If the flasks are to be kept for more than a couple of days, or are to be shipped, before using, cover the mouth of the flasks before sterilizing with paper fastened by a rubber band or by tinfoil, to retard evaporation.

PLATING.

Dilutions.—For miscellaneous milk samples the character of which is not known, three dilutions shall be made: 1-100, 1-1,000, and 1-10,000. Where the character of the milk is known, the number of dilutions may be reduced. If the milk is pasteurized, certified, or known to be fresh and of high grade, the 10,000 and the 1,000 dilutions may be omitted; if the milk is known to be old and of high bacterial content, the 100 dilution may be omitted. In no case shall less than two plates be made of each sample.

Any convenient method of making dilutions may be used, always using pipettes and sterile water blanks. The water used for dilutions may be placed in dilution bottles (99 cc. and 9 cc. are convenient sizes) and sterilized for one hour in an autoclav at 15 lbs. pressure. These should be marked so that it can be determined that they have neither gained or lost water during or subsequent to sterilization. Or the water may be sterilized in bulk, if kept in a properly guarded container, and subsequently measured directly into dilution bottles with sterilized pipettes.

The dilution bottles should have glass stoppers or some other type of closing that makes shaking possible. Cotton plugs are unsatisfactory because the dilution water will soak into the cotton.

Straight-sided pipettes graduated to deliver between two marks are best, but pipettes marked to deliver may be used if care is taken that the points are not broken, and the tube is completely emptied.

In making dilutions the original sample and each dilution bottle shall be shaken 25 times, each shake being an up and down motion with an excursion of about one foot. After the final dilution fill a pipette to the mark and allow the contents to run into an empty Petri dish, the end of the pipette touching the bottom of the dish as the liquid runs out. If the pipette is one that delivers 1 cc., be sure that the last drop is carried into the Petri dish.

(Pipettes should be placed immediately in water after using to make subsequent cleaning easier.)

The flasks (or test tubes) of agar shall be melted in boiling water or steam and after melting should be cooled to 45° C. before using.

Pour 10 cc. of the melted agar in each inoculated Petri dish, and by a gentle rotary motion thoroughly mix the agar and the diluted milk. As nearly as possible the same amount of agar should be poured into each Petri dish so that the depth of the agar in all be uniform. If desired, 10 cc. may be measured out from the flask with a sterile pipette.

After the dilution of the milk not more than half an hour should elapse before the agar is poured into the Petri dishes.

After the agar has thoroughly hardened place the Petri dishes in an incubating oven, inverted, in order to reduce the danger of spreaders. While clay tops of Petri dishes are useful for some purpose they are not recognized in the standard methods.

INCUBATION AND COUNTING.

Incubation.—Only one period of incubation and one temperature is regarded as standard, 48 hours at 37.5° C. In crowded incubators ventilation should be provided.

Counting.—If among the different dilutions there are plates containing from 30 to 300 colonies these should be counted, and the number, multiplied by the dilution, be reported as the final count. All colonies on such plates should be counted, and the numbers averaged. If there are no plates within these limits the one that comes nearest to 300 is to be counted. No plate that contains less than twenty colonies shall be counted, unless it

happens that there are no plates with a larger number of colonies, or unless the numbers in the plates check with other dilutions. If the number of colonies on the plate to be counted is over 300, a part of the plate may be counted, and the whole plate averaged.

Counting shall be done with a lens, magnifying $2\frac{1}{2}$ diameters (or what the opticians call a $3\frac{1}{2}\times$ lens). Nearsighted persons should use their glasses in counting, but farsighted persons should remove them. In case it is doubtful whether certain objects are colonies or dirt specks they should be examined with a compound microscope.

Reports.—In making reports it must be borne in mind that with high numbers obtained by the routine method, only an approximation to accuracy can be obtained. Only the left-hand figures of the final numbers are of significance. It is best, therefore, to report only the two left-hand figures of the results, in order to avoid an unwarranted impression of accuracy. For example, when the numbers are in millions no figures smaller than the millions have any significance in the routine analysis of milk. In making the report raise the number to the next highest round number, but never lower it.

In no case shall the count of a single plate be regarded as sufficient for the purpose of grading milk. If a single sample of milk only is to be tested there should be at least three plates counted before a report is made.

RESEARCH METHODS.

To set standards for research methods is neither practical nor desir-

able. These methods must be developed in each case by the research worker. It is sufficient simply to point out that the routine methods here outlined will usually be inadequate for research where great accuracy is demanded. Greater care in collecting the sample and a more extended series of dilutions so as to get properly seeded plates will be needed. Special media and special incubation temperatures will also usually be necessary. The Standard Methods, for example, are not such as give a proper count of lactic acid bacteria. Where any line of research requires nothing more than a count of the numbers of bacteria in milk, the routine methods above described shall be used in order that the results be comparable to other bacterial counts, and if any other method than the routine be employed this shall be carefully stated so that no erroneous comparisons be drawn between the reported numbers and the numbers that might be expected from the use of standard routine methods.

INTERPRETATION OF RESULTS.

The interpretation of the bacteriological analysis of market milk must depend upon the history of the milk. It is therefore difficult to give any general interpretation. The following are a few significant conclusions.

1. Where the analysis can be made immediately after the milking the number of bacteria enables conclusions to be drawn as to the cleanliness and care in the dairy and the thoroughness in the cleaning and sterilizing of the

milk vessels, or sometimes the presence of cows with infected udders. With properly cleaned and sterilized milk vessels and proper care in the farm and dairy the numbers of bacteria should not exceed 10,000, and may easily be brought down to 5,000. Numbers beyond these in milk analyzed immediately after the milking may be regarded as an indication of unclean dairy methods, dirty and unsterile milking vessels, or to infected udders. Apart from infected udders the factors in dairying that most noticeably increase the bacteria count are unsterile milk vessels, unsterile strainers, unclean udders, and failure to cool the milk promptly.

2. If the milk is properly cooled with ice the numbers should not materially increase in five to seven hours. Communities within five to seven hours of their dairies should, if perfect conditions prevail, be able to obtain milk with nearly as low a count as above indicated. Hence in such communities bacterial counts above these numbers should not be found in properly guarded milk. A count of 50,000 in such a community is an indication either of unsatisfactory dairy conditions or of failure to properly cool the milk during transportation. Night's milk if properly cooled can also easily be brought within these limits if analyzed the next morning. A count of over 50,000 for a community close to the dairies must be regarded as unsatisfactory, and the number should approach the 10,000 mark for high grade milk. In hot summer weather the difficulties of keeping low counts are greater, but

even then they need not surpass 50,000 if the milk is properly cooled.

3. Where milk must be a longer time in transportation from the dairy there will inevitably be an increase in bacteria, depending on the length of time and the temperature. Experience has shown, however, that even in these conditions the excessively high numbers that have frequently been found in city milk are in reality due to diseased udders, to dirty dairy conditions, to dirty and unsterile milk utensils, or culpable neglect of cooling. Moreover, such high bacterial counts at the shipping station are frequently traceable to a few dirty dairies whose milk with an abnormally high count contaminates the rest of the supply. Dirty shipping cases and warm temperatures in shipping are responsible for most of the high bacterial counts in city milk. Where the milk from healthy cows reaches the city within twenty-four hours, however, the number should not be over 100,000 in winter or 200,000 in summer, and numbers in excess of this may be regarded as due either to improper dairy conditions, dirty milk vessels, insufficient cooling or perhaps to diseased udders. In larger cities where much of the milk is forty-eight hours in reaching the city, higher numbers may naturally be expected; but even under these conditions there is no good reason why the number of bacteria should reach 1,000,000; and it may mostly be brought down to below 200,000. In such cities, therefore, milk with more than 1,000,000 bacteria must be regarded as im-

properly guarded either at the dairy or on its transit.

4. For a Grade A milk higher demands should be made than for the ordinary grade. The standard set by the Milk Commission for Grade A, viz., of 200,000 for milk to be subsequently pasteurized or for 100,000 to be used raw, is stated by that Commission to be an extreme limit for the most unfavorable conditions. Cities situated near the supplying dairies should demand a much higher standard, which should not allow over 10,000 in bacterial content in Grade A milk in communities favorably situated.

5. For communities situated where ice is not available it may be necessary to accept a milk with a higher bacterial content; but as rapidly as possible the standard should be made to approach the limits as above given.

THE MICROSCOPIC METHOD OF ANALYSIS.

The practice of counting the bacteria in milk by means of the microscope has been in the last few years coming somewhat rapidly into use, and offers several advantages. 1. It is extremely rapid, making reports possible within a very few hours. 2. It is simple, and requires little apparatus. 3. It gives a means whereby the actual numbers of bacteria can be determined, and in this way gives a more reliable count than the plate count, and it also gives some idea as to the kinds of bacteria.

On the other hand, it requires considerable experience to obtain reliable results, and because it does not dis-

tinguish the living from the dead it is not applicable at the present time to the study of pasteurized milk. Its manifest advantages for some purposes makes it certain, however, that its use will extend, and for this reason it is included in these Standard Methods.

Various methods of the microscopic study of milk have been described, but that which may be called the *direct microscopic examination* of milk is the simplest and most reliable, and is recognized in this report as Standard. It is as follows:

Samples.—Milk samples collected as above described may be preserved by icing and handled as in the case of the plate method. All samples on which the cream has risen to the surface must be vigorously shaken before preparations are made from them.

Apparatus.—In addition to a microscope and ordinary microscopic slides, stains, etc., the only special apparatus required is a pipette which measures $\frac{1}{100}$ cc. The most convenient form of pipette is the straight capillary pipette, calibrated to deliver $\frac{1}{100}$ cc., the graduation mark being $1\frac{1}{2}$ to $2\frac{1}{2}$ inches from the tip. Such pipettes are now for sale by manufacturers, and can be easily obtained. The calibration should be tested by weighing with chemical balances the amount of milk discharged from the tube. Only a single pipette is needed in making a series of tests, provided this is kept clean while in use. In this kind of work cleanliness rather than sterilization is required. Clean towels may be used for wiping the exterior of these pipettes, while their bores may be

kept clean by rinsing them in clean water between each sample. The small amount of water left in the tube may be rinsed out into the milk sample under examination. This method of procedure, while adding a small number of bacteria to each sample, introduces only a theoretical error, tests showing that such bacteria cannot subsequently be detected, and make no difference in the final result.

Preparation of Smears.—One one-hundredth cc. of milk or cream is deposited upon a clean glass slide by means of the pipette above described. By the use of a clean stiff needle this drop of milk is spread over an area of one square centimeter. This may be most conveniently done by placing the slide upon any glass or paper ruled into areas one centimeter square. These marks showing through the glass serve as guides. After uniform spreading the preparation is dried in a warm place upon a level surface. In order to prevent noticeable growth this drying must be accomplished within five to ten minutes; but excessive heat must be avoided or the dry films may crack and peel from the slides in later handling.

After drying, the slides are to be dipped in xylol (gasoline may be used) for one minute, then drained and the slides dried. They are then immersed in 90 per cent grain or denatured alcohol, for one minute or more, and then transferred to a fresh aqueous solution of methylene blue. Old or unfiltered stains are to be avoided, as they may contain troublesome precipitates. The slides remain in this solution from five seconds to one

minute or longer, depending upon the effect desired, and are then rinsed in water to remove the surplus stain, and decolorized in alcohol. The decolorization takes several seconds to a minute, during which time the slide must be under observation in order that the decolorization may not proceed too far before they are removed from the alcohol. When properly decolorized the general background of the film should show a faint blue tint. Poorly stained slides may be decolorized and restained as many times as necessary, without any apparent injury. After drying the slides may be examined at once, or they may be filed away and preserved for further reference.

Standardization of the Microscope.—The microscope to be used must be adjusted in such a way that each field of the microscope covers a certain known fraction of the total square centimeter's area. This procedure is simple, with the proper materials at hand. The microscope should have a 1.9 mm. ($\frac{1}{12}$ inch) oil immersion objective, and an ocular giving approximately the field desired, and should preferably be fitted with a mechanical stage. To standardize the microscope, place upon the stage a stage micrometer, and by the selection of oculars or adjusting the draw tube, or both, bring the diameter of the whole microscopic field to .205 mm. When so adjusted, the microscopic field will cover almost exactly $\frac{1}{300,000}$ of a cubic centimeter of the milk (actually $\frac{1}{302840}$). This means that if the bacteria in one field only are counted, the number should be multiplied by 300,000 to give the total

number in a cubic centimeter. If the bacteria in a hundred fields are to be counted, the total should of course be multiplied by 3,000.

Inasmuch as it is difficult to count bacteria lying near the margin of the microscopic field, it is much better to have an eyepiece micrometer, with a circular ruling, 8 mm. in diameter, and divided into quadrants. This will give, in the microscopic field, a smaller area within which the bacteria may be seen most sharply, and which may be more easily counted. Such eyepiece micrometers are now manufactured by laboratory supply houses, and may be easily obtained.* In the use of this eyepiece micrometer the inner circle, by the adjustment of the draw tube, should be made to cover a circle with a diameter of .146 mm. In this case this inner circle will cover $\frac{1}{600,000}$ of a cubic centimeter of milk, meaning, of course, that the number of bacteria in a single field should be multiplied by 600,000, or, if a hundred fields are counted, by 6,000, to obtain the number per cubic centimeter.

The number of microscopic fields to be counted will depend somewhat upon the kind of data that is desired. If this method is to be used simply for the purpose of dividing milk into grades, it will in most cases be unnecessary to do the actual counting, since a Grade A milk will show field after field without any bacteria at all, while a Grade C milk will show the field crowded with bacteria. In all doubtful cases, however, counting should be done, and there should never be less than thirty fields counted

in order to have reliable results. Counting thirty fields is not so tedious a task as would seem to be, since in ordinary milk the number of bacteria in each field is small, and the counting may be done very rapidly.

Counting.—Counting the bacteria in such a smear may be done in two ways. 1. The number of groups of one or more bacteria present. 2. The number of individuals. The second, of course, is really the correct count of the number of bacteria, but the former will give a count much closer to that obtained by the plate count, since the colonies upon the plate represent groups of bacteria rather than individuals, each group growing into a single colony, only. Extensive tests have shown that there is a fair correspondence between the number of groups reported by experienced observers and the number of colonies that may grow in plates made from the same milk, although there are occasionally discrepancies of considerable extent. These discrepancies are caused by variations in judgment as to what constitutes a group, variations in the extent to which groups break up in the dilution waters when the smears are made, and the presence of dead bacteria or of bacteria which do not grow on the plates. Some experience is needed by the microscopist in determining just what should be counted. In high grade milks, an inexperienced person is apt to fail to recognize differences between bacteria and other minute objects. This results as a rule in an over-count by inexperienced men. In milk containing many readily recognizable

* Listed by Bausch and Lomb Optical Co.

bacteria in each field the inexperienced man is apt to overlook some of them, giving an undercount. These difficulties are overcome, however, by training and experience.

INTERPRETATION OF RESULTS.

It must be recognized that the results obtained from the microscopic record give a closer approximation to the actual number of bacteria present in the milk than those obtained by the plate method, since the plate method will count as one, either a single bacterium or a group which may sometimes contain a hundred or even more individuals. Inasmuch, however, as the plate count has become a method of analysis that is well known and commonly applied, it becomes desirable to know as closely as possible what relations there may be between the plate count and the microscopic count. Experience has shown that the count of individual bacteria is ordinarily 1.5 to 8 times as great as the plate count, the ratio between the two being largely dependent upon the size of the clumps of bacteria present. Where the bacteria are mostly isolated, the ratio of the two counts would be much closer than where there are present long chains of streptococci or masses of cocci. After one has had a little experience in counting clumps it is found that the number of groups shown by the microscope, agrees fairly well with the number of colonies shown by the plate count, though even here there are occasionally discrepancies, due among other things to the appearance in the microscope of kinds of bacteria which

fail to grow in the culture media used in making plates. In all cases, however, the direct count of raw milk will give a much closer approximation to the actual numbers of bacteria than the plate count. In view of these facts it is difficult to interpret one count in terms of the other; but a few suggestions will give a fairly satisfactory idea as to how the two may be related.

Grade A raw milk, which should have less than 100,000 bacteria per cc., will not show more than three to four small clumps of bacteria for each 30 fields of the microscope where the diameter of the fields is .205 mm. Such milk also ought not to contain more than 500,000 individual bacteria per cc. when counted by the microscope. For Grade A pasteurized milk (which should have less than 200,000 per cc. by the plate count before pasteurization) the microscope should not show more than six to eight clumps per 30 microscopic fields, and not more than 1,000,000 individual bacteria when counted with the microscope.

Grade B milk, which is supposed not to have more than 1,000,000 bacteria before pasteurization, when counted by the plating method, should not show more than 20 individual bacteria per fields, where the diameter of the fields is .205 mm., and not more than three to four groups of bacteria per field.

While the above relation between the plate count and the microscopic counts cannot be relied upon as having a very great amount of accuracy, it will serve to give a general idea of

the ratio between the two under ordinary conditions, and may serve as a guide in the use of the direct microscopic method.

The direct microscopic method is not as yet recommended by this committee as a method of estimating the numbers of bacteria that are present in samples of milk. For this purpose the plate method, which has long been in use and is fairly well understood, is still recommended as the standard method to be employed. For the purpose of rapidly dividing raw milk into a series of grades, in such a way that the results can be obtained in the quickest possible time, the direct microscopic method seems to be extremely useful, and the results which are obtained will in nearly all cases agree with those obtained by the plate count, and probably in all cases will give a closer approximation to the fair grading than the plate count can do. For these reasons the use of the direct microscopic method is extremely

valuable at the dairy end of the milk route, where the farmer wishes to know the kind of milk he is producing, or the purchaser at the shipping station wishes to know the kind that he is receiving from the farmer. It is of less value at the city end of the milk route, especially if pasteurization of the milk has been introduced anywhere along the route. It is especially useful in the data it gives concerning the kinds of bacteria present in milk, since it sometimes enables the farmer quickly to pick out from his herds such cows as are discharging large numbers of streptococci, thus giving a very efficient means of protecting the milk supply from this type of organisms that are today recognized as suspicious and decidedly undesirable.

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PLAIN COMMON SENSE.

Dog fanciers have long noted that when a house-dog begins to get fat and wheezy it is pretty apt to be attacked by a stubborn skin disease. In such a case they cut down the diet and increase the open air exercise, thus relieving the over-burdened body of poisonous substances.

The sin of gluttony is common and therefore much condoned, but like every other violation of nature's laws has a penalty. Fat inefficiency, sluggish mentality, the reddened nose, the pimpled face, certain of the chronic skin eruptions, and much fatigue and nervousness are due to the abuse of the digestive apparatus. Rich, indigestible foods in large quantities, highly seasoned to stimulate the jaded palate, are forced into a body already rebellious from re-

pletion. Exercise is largely limited to walking to and from the table and bodily deterioration proceeds rapidly. Many an overfed dyspeptic, suddenly dragged by the stern hand of circumstances from a life of physical ease and plenty and forced to work out of doors suddenly discovers that his semi-invalidism has gone, that a chronic skin derangement of many year's standing has disappeared and that a new vigor and zest of life has been given him.

Not everyone can spend his whole time in the open air but a certain amount of exercise and plain wholesome food in an amount not exceeding the body's needs can be had by almost everyone. Simple moderate diet and exercise make for health. These are not faddish food theories: they are just plain common sense.

BIBLIOGRAPHY OF TUBERCULOSIS IN ITS RELATION TO HOUSE INFECTION AND HOUSING BETTERMENT.

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We are pleased to present to our readers this extensive and important bibliography. It should prove of great usefulness to all departments of public service.

THIS bibliography covers the recent literature of the medical and social sciences (especially that of the last fifteen years) in so far as it deals with the correlation of housing and tuberculosis. It has proved impracticable to include titles from the following associated fields: infection through house-dust, vitiated air, or house insects; the viability of tubercle bacilli in dark rooms, family infection, racial susceptibilities, house disinfection, or the housing of special classes, *i. e.*, the insane or the criminal. The literature on each of these latter divisions is large and pertinent. Many references to it will be found in the general articles listed in Section I.

Section II probably includes most of the important original local studies made of the correlation of tuberculosis with housing conditions. It is likely, however, that some valuable studies are lost in forgotten annual reports for, in several instances, the anti-tuberculosis associations and boards of health of American cities replying to my letters of inquiry, concerning local in-

vestigations, have failed to make mention of important studies made within their own boundaries. Important European official reports are quoted in Newsholme: "The Prevention of Tuberculosis"; Dewsnup: "Housing Problem in England"; Sykes: "Public Health and Housing" and by other writers in Section I. They are not included in the list because of their relative inaccessibility.

Section III on "Improved Housing, with Special Reference to Tuberculous Families," includes only a brief selection of the pertinent titles. Most of the literature upon the care of the consumptive deals to some extent with the housing of the patient. All of the literature of housing betterment is directly or indirectly suggestive of means of preventing tuberculosis. The selected titles in Section III are, therefore, in the main such as by their wording might be confused with titles belonging in Sections I and II. A few useful supplementary titles were inserted mainly because of their availability.

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Book Reviews.

The Pasteurization of Milk from the Mechanical Viewpoint. *Chas. H. Kilbourn. John Wiley & Sons, Inc., New York. 1916. Pp. 241. Illustrated.*

The milk dealer will surely become antagonistic while pursuing the first few pages of Mr. Kilbourn's little book, but as the suspicious natured inspector becomes less in evidence and the good sound sense of the man of practical experience begins to pour out information backed by chemical and bacteriological tests, showing a keen realization of the seriousness of the obstacles ever confronting him, he is immediately won over.

Mr. Kilbourn seems to have fairly brought out the advantages and disadvantages of each type of commercial pasteurizer discussed and gives tables of results from each type both as to bacterial content and percentage elimination and the effect of different temperatures on the cream line. The bad effect of pumping and agitating milk, particularly when hot, and after being pasteurized, is well discussed.

The chapter on cleaning of apparatus and

containers is good, although in the tables of bacteriological results the milk in most cases had many more bacteria when it reached the bottle than when it left the cooler (average of all tests almost three times as many) showing that the good advice of the author was not always followed.

The author discusses in detail the various types of heaters, holders and coolers with the manufacturers' drawings of each; also two types of temperature controlling and recording instruments.

The small dealer who is just contemplating pasteurization can ill afford to be without this little guide and dealers who have been pasteurizing for years can surely get some ideas as dearly purchased by others as their own knowledge has been in the hard and expensive school of experience.

S. G. Birby.

Eat Your Way to Health. *By Robert Hugh Rose, M. D. Published by Robert J. Shores, New York. 1916. Net \$10.0.*

Doctor Rose has written his book in a very simple and frank manner, which can be very well understood and interpreted by the general public, it not being necessary to be an expert in dietetics to get his very definite meaning. It is this characteristic which makes the book very important, as otherwise the reader at large might find it difficult to digest and would be unwilling to try the recommendations that Doctor Rose has put forth.

While the subjects of foods and diets are discussed in a simple manner, scientific truths which have been developed by leading experts

along these lines through their various experiments are maintained throughout the book. The author tells us the pleasures that are obtained through a simple fare; why and what we should eat; how to estimate food values; the vital importance of proteins; losing the superfluous and gaining the desirable.

On the whole, the book ought to be a very popular one and while it is not written in an elaborate scientific manner, it no doubt would be enjoyed and appreciated by the scientist.

James T-B. Bowles.

Health Department Reports and Notes.

REPORTS.

Buffalo, New York.

Unlike most reports the 1915 annual report of this city is distinctly a report of the sub-departments. After an excellent preface devoted to a discussion of the duties and expansion of a modern health department and to pointing out the value of the work done by the various bureaus, Health Commissioner Fronczak leaves the discussion of the results of such work to the chiefs of the bureaus, themselves.

It is interesting to note that the report of the Secretary shows that more than twice the amount of money is expended by the Bureau of Child Hygiene than is expended by any other bureau. The per capita expenditure for health work by this city of 462,000 population is approximately forty-eight cents.

The report of the Assistant Commissioner of Health, Doctor Schaefer, comprises the hospital report and the report of the Bureau of Child Hygiene of which he is chief. The hospital report emphasizes the common and absurd condition, namely the occurrence of "repeaters" in the hospitals. This term is not applied to malingers, but to patients who have been discharged as cured for one disease, returning with the sequelae of that disease some time later. This necessarily involves additional expense and great economic loss. It is advocated as a remedy of this needless waste to establish a convalescent hospital, preferably a convalescent farm, where these people can be sent while convalescing, and at the same time perform supervised service and work. It is further suggested to establish a social service branch for all such city cases. The Bureau of Child Hygiene comprises Infant Welfare, Midwifery, Children's Institutions, Medical and Dental School Inspection, Dentists and Child Labor Divisions. The principle work is directed to potential mothers, expectant mothers and mothers. The first class is reached by numerous "Little Mothers' Leagues" which during the reported year enrolled some 1,800 members. Efficient

midwifery seems to prevail though there evidently is conflict between the county and state authorities over the revocation of licenses. It is hoped that midwifery may eventually be overcome, and solving of this problem seems to hinge on the possible expansion of the visiting nurses association. All midwife births are followed up, and the results are singularly gratifying. Excellent results have been accomplished from the establishment of milk stations, the dispensing of free milk, food and medicines, and the continuance of the infant welfare stations. The extensive and painstaking work carried out at the Detention Home of the Juvenile Court, which comprises physical examination and psychological work, is yielding encouraging results. The demands on the Division of Mental Hygiene services is increasing. The aims of this division are as follows: 1. Discovery of backward and subnormal individuals; 2. Diagnosis of mental and physical defects; 3. Grading of mental and physical defectives; 4. Assistance of parents, physicians and others to the best means of improving the child; 5. Cooperation with the schools in selecting pupils for their special classes and examining them from time to time. 6. Recommending procedures for the relief and correction of mental and physical defects. 7. Instruction of the public in the necessity of custodial care for all cases that are potentially dangerous to society. 8. The endeavor to show the city that prevention of feeble-mindedness is practicable, while cure is impossible. The recommendations of this division are in accordance with their aims. All other divisions of this bureau have carried out their work with unusual capability. The work of the bureau is an excellent example of what can be accomplished by efficient organization and a keen insight as to what can eventually be accomplished in the health of a city by applying concrete and modern methods in controlling the health of the children.

The Bureau of Vital Statistics and Communicable Diseases presents an excellent report, under the able supervision of Dr. Franklin C. Gram. A study of Buffalo's comparative statistical table shows that in 1882 the first year when accurate records were kept the death-rate was 24.06 and the birth-rate was 27.47 per 1,000, with a population of 175,000; in 1915 the death-rate was 14.83 and the birth-rate 27.45 with a population of 462,000. Perhaps the most significant feature of this reduction is in the infant mortality rate, particularly in deaths under one year during the three summer months, the figures for 1913, 1914, and 1915 being 584, 494, and 370 respectively. Nine hundred sixty cases of diphtheria were reported during the year with 78³ deaths. This is justly considered too high a mortality, and the fault is the tardy or non-reporting of this disease, due to home diagnosis of sore throat, fear of quarantine, or reason similar to those advanced by antivaccinationists. Two hundred fifty-nine cases of typhoid fever with 46 deaths were reported. "Measles, 'Only Measles', the despised trouble maker for children, claimed 51 deaths out of 4,904 cases; while scarlet fever, which inspires awe, killed only 25 out of 662 cases." Mumps and chickenpox both ran over 1,000 cases.

One thousand four hundred forty cases of tuberculosis in all forms were reported during the year with 709 deaths. Its is stated that deaths from pulmonary tuberculosis have not increased above the proportionate increase in cases of the disease reported. Complete and excellent tables accompany the report of this Bureau.

The Bureau of Food and Drugs, with limited facilities and restricted authority, have so well organized their forces that a general cleanup of places where food is produced and handled has been effected. Considerable coöperation seems to be exhibited here, and the few chronic offenders are reported to offend more from indifference than from maliciousness. The Reports of the Bureaus of Sanitation and Plumbing and Drainage complete this report, and these show that this work is being carried out in the same efficient and active manner that is exhibited by the other Bureaus.

In conclusion let us state that this report shows that the Department of Health of Buffalo is doing most creditable work, and in its organization and methods might well serve as an example to other departments of health throughout the country, particularly in the field of Child Hygiene.

Spokane, Washington.

We often wonder why it is that the average annual report of a city health department is bound and made up in a style so somber and nonconducive to stimulate interest in the lay mind. As a consequence it is surprising how refreshing it is to take up and read the report of Spokane, where attention has been paid to typography, illustration and general make up. Attractiveness such as this may seem to some petty and superfluous, but it assuredly tends to stimulate interest and local pride, and such health department publicity is woefully lacking in the average American city.

With just pride the department points first to its extremely low infant mortality rate of 76.6 per 1,000 births. Referring to the mortality table, it is found that there were 153 deaths under one year of age, 100 of which were due to premature birth, congenital debility, or other causes peculiar to early infancy.

In consequence of this, it is advocated that a greater amount of attention be given in the way of proper instruction to prospective mothers.

A decrease of 23 per cent. is recorded in deaths from diarrhea and enteritis. Attention is called to the increase in organic heart disease, Bright's disease and cancer.

The total deaths numbered 1,165, giving a rate of 8.14 per 1,000 population if based upon the population estimate of 142,990 by the United States Bureau of Census. It is felt however that this estimate is too high. Based upon the Chamber of Commerce census however of 120,000 the rate becomes 9.70. In either case the rate is most commendable.

Vital statistics evidently have been carried to a high degree of accuracy and refinement. The department feels sure all deaths are reported and that 95 per cent. of the births are reported. In an effort to obtain 100 per cent. reporting, a

plan has been adopted of sending a certified index card to the mother, made sufficiently attractive to arrest attention and stimulate inquiry by the mother at the health office.

In the matter of sanitation and personal hygiene, the educational method of impressing the child with its importance by exhibits is being continued. In connection with this method, Doctor Anderson, the Health Officer, states:

"We cling to the idea of impressing the child, for it seems that our greatest hope of ultimate success is to train the child so to live that when he reaches manhood his habits, which we presume will then be permanently fixed, will be right habits. Through no other means can routine of personal hygiene, physical sanitation and civic cleanliness be more permanently fixed, and the public be delivered from the terrible scourge of preventable diseases which are today causing more suffering, more poverty and more death than the great European war. This view we hope to fix in the minds of the coming generation through the medium of education, as to the inevitable consequences of carelessness."

Contagious diseases were comparatively few during the year. In regard to the control of communicable disease, particularly in the case of measles and whooping-cough, where the problem of control is a difficult one because of the

fact that absence from school influences the child's scholastic standing, it is suggested that the child be credited with school attendance for each day actually lost by contagious diseases, if such absences be certified by the health officer. It is true that this procedure is open to abuse, but the health officer believes that such uncertain possible abuse will be counterbalanced by the good obtained therefrom. It is also advocated that in the case of whooping-cough, a disease which demands fresh air, that the wearing of colored arm bands be made compulsory by those infected, thus warning other children of the proximity of contagious disease. It is also suggested to place a premium on the obeying of rules and regulations in the control of infectious diseases, such as possible the placarding of a home where such regulations are not adhered to.

Extensive work is being carried out in regard to food inspection and control. Of particular interest in the sub-reports are charts depicting the improvement of the milk supply during the last two years. Excellent tables accompany this report. Of especial interest is one of the preface pages which contains definite data relative to the statistics of the city in all departments of public service.

Savannah, Georgia.

This southern city reports a 1915 death-rate of 19.39 per 1,000 population, a rate of 11.59 attributed to the white population, and 26.39 to the colored. Strangely, though the white death-rate is decreasing, the colored death-rate has increased since 1913 from 24.71 to 26.39. No doubt this is partly due to better and more complete vital statistical data, yet it makes the disparity between the rates more obvious. As is generally the case in the south, the excessive colored death-rate is attributed to the fact that the health department does not throw around the colored population, particularly in the congested districts, the same safeguards that are placed around the white. This condition is manifested most noticeably in the lack of any building laws applicable to the Negro, naturally resulting in bad or complete absence of sanitary facilities, which, consequently, according to the report, cause the excessive mortality among the

colored people from tuberculosis and pneumonia. In this instance the colored death-rate from the former is four times and in the latter three times as great as among the white population. This experience unfortunately seems to be common to most southern cities. To quote the health officer, Dr. W. F. Brunner, in this matter:

"When a child is born, the white child has got four chances against the Negro's one to reach his first birthday. Even before the birth of the child, the white baby has a five-to-one chance of being born alive over the Negro, and, again, your health officer urges that a commission be appointed to look into the sanitary and moral evils which surround the Negro. The colored and Negro people are advancing rapidly, but without the sanitary and moral support of the controlling element, namely, the white people, his progress must be retarded."

Tuberculosis caused 225 deaths, 28 white and 197 colored; pneumonia 126 deaths, 30 white and 96 colored; and this variance in a general way applies for all the principal causes of death. It is worthy of note that there were no outbreaks of any of the transmissible diseases. Four deaths were reported from diphtheria, the lowest number yet recorded; no deaths from scarlet fever; one death from measles, though this disease is not reportable; and four deaths from whooping-cough. Typhoid fever claimed 7 deaths among the white and 13 among the colored population. Only one case of smallpox was reported and this was brought in from the outside, which speaks well for thorough vaccination throughout the city. In this connection it is emphasized that the Negro is not hiding this disease any longer, and is obedient and appreciative of the sanitary regulations instituted to combat the spread of this disease.

Difficulty seems to be experienced in obtaining complete birth returns from the physicians and midwives. Not more than 80 per cent. of the births are reported. It is unfortunate that there is no evidence from the report of infant

welfare work throughout the year, nor is there any data published from which one could determine the extent of the infant mortality.

During the year extensive work was carried out with the purpose of establishing a high grade of purity for the Savannah water. The city water supply is from artesian wells. Examination was made of all sources of supply and conduits, with the result that it is hoped to bring the standard of purity up to and better than that adopted by the United States Public Health Service for interstate carriers. It is evident by a study of the reports of the sub-departments that their work is being carried out in a thorough and scientific manner.

The most striking feature of this report, and of the most of the recent reports from the cities of the south, is the active and sincere desire to improve the health status of the Negro—a task made difficult by ignorance, racial apathy and prejudice. Education and coöperation seem to be the chief points of attack, and though the process may be long and tedious, the results will surely be worthy of the effort.

Edmonton, Alberta.

With the advent of war many of the Canadian cities have been forced to face new conditions which have to a greater or less extent seriously affected the work of the department of health. Among these changed conditions may be mentioned the decrease of the population, the decrease of the staff of the department necessitated by a decreased financial appropriation, the withdrawing of many physicians from their local practices for war service, and the falling off of employment in the city itself. These conditions have necessarily resulted in a certain laxity in the enforcement of some of the sanitary regulations which less directly influence a city's health. Yet in spite of this, this city of some 60,000 inhabitants reports a low death-rate of 8.23 per 1,000 population. Nearly 75 per cent. of the 2,079 cases of communicable disease reported was due to measles, and fortunately this disease seems to have been the only one of epidemic proportions. During the year, 55 cases of typhoid were reported, 31 of which were city cases, which upon analysis showed that most of the cases developed from contaminated well water,

or the use of river water below the sewer outlet. Forty-four cases of tuberculosis were reported, only 2 of which could properly be called city cases. Since it is rare that a patient can assist financially in his cure, the department rightly feels that it is an injustice to the city to be made to attend to these outside cases, and urges either the establishment of a provincial sanitarium or the reimbursement by the government for such care as the city gives. All the cases were in the advanced stages, and 44 deaths occurred, which seemed to imply that a great many cases in the earlier stages are not reported, and that the "same reprehensible apathy, indifference or prejudice regarding the reporting of this disease exists among physicians here, as elsewhere." The infant mortality rate per 1,000 births of 89.7 compares favorably with other years, and it is due to the marked reduction in deaths from summer diarrhea, which is attributed to the improvement of the milk supply. In closing it is interesting to note the increase in the birth-rate per 1,000 population. In 1913 the rate

was 23, in 1914, 29, in 1915, 33.6. This, it is felt, is due mostly to the fact that a great many births of children of enlisted men have been

recorded in order to obtain the patriotic allowance, which only serves to emphasize the previous laxity in the reporting of births.

Lynn, Massachusetts.

It is with a spirit of satisfaction that this New England industrial city of some 98,000 records an average death-rate for the last five years of 12.14, which varied from 12.60 in 1911 to 11.94 in 1915 per 1,000 population. The average for the previous five-year period was 14.11. It is gratifying to note that there were marked reduction both in the number of cases and in the number of deaths of three of the most important fields of disease with which a health department has to deal. The number of deaths among children under one year of age shows a decrease of 23 from the number reported in 1914. The Board of Health advocates the employment of

two school nurses in order to further diminish this rate. Typhoid fever, with 61 cases reported during the year, showed a decrease of 18 cases since 1914. Only three deaths are recorded, which is the lowest number in the history of the city. The result is attributed to the constant watch over the milk and food supply. Tuberculosis, with 109 deaths or a death-rate of 1.10, shows practically a constant diminution of mortality during recent years, and the work carried out by this city in this connection is admirable. It is interesting to note the excellent photographs accompanying this report which well illustrate the activities of the department.

Newport, Rhode Island.

The 1915 annual report of Newport gives for this city of 31,209 population a death-rate of 11.69 per 1,000 population. During the year the general health of the city was good, and at no time did any disease become particularly prevalent. Deaths from communicable disease aggregated only 6, 4 from typhoid, and 1 each diphtheria and whooping-cough. This summation excludes tuberculosis. The number of cases of scarlet fever and diphtheria, 19 and 6 respectively with the lowest numbers reported since the board was constituted in 1901. Not one case of the seven reported cases of typhoid

fever is attributable to the milk or water supply. Fifty cases of tuberculosis were reported with 18 deaths. Deaths among infants under 1 year of age numbered 42, which would indicate that the 1915 infant mortality rate would be considerably lower than previously, though, since the birth reports are incomplete, no rate has been calculated. Among the several excellent sub-reports, that of the department of Dental Inspection is worthy of note, and since the installation of this department four years ago great improvement has been made in the general care of the children's teeth.

Lowell, Massachusetts.

The thirty-eighth annual report of this city records the comparatively high death-rate of 17.12 per 1,000 population. This city is strictly industrial, with a large foreign population, which probably partially accounts for this excessive death-rate. In this connection it is interesting to note that of the 1,820 deaths (still-births excluded), 324 were due to diseases of the respiratory apparatus, exclusive of tuberculosis which claimed 133. Diseases of the circulatory apparatus also claimed a large portion of the total deaths, 326 being reported, of which acute endocarditis claimed 73, organic diseases of the heart 110, and affections of the arteries 120. Diarrhea and enteritis caused 158 deaths under two years of age. There were 460 deaths of children under 1 year of age, which is an increase over the record

of last year. The death toll from 112 cases of typhoid was 18, which is the greatest number of each since 1910. The only marked decrease among the more common communicable diseases is in the case of measles, there being 164 cases reported with no deaths, as compared with 531 cases in 1914, and 619 cases in 1913. It is indeed most difficult to acquire an accurate impression of the health work of this city of 105,000, because, though the report is profuse in vital statistics and tables, no rates are given throughout the report, and unfortunately no discussion of any kind accompanies any of the departments' reports. It is the dearth of such material which makes such a report uninteresting and scarcely intelligible to the lay mind. Fortunately an index is supplied.

NOTES.

Why Local Boards of Health Fail.—"The shortcomings of local public health officials throughout the country, and the inefficiency of their work, are common knowledge among trained, thoughtful sanitarians and are beginning to be appreciated by the public," states the October issue of the *Public Health News*, published by the New Jersey State Department of Health, in another critical discussion of local boards of health. The infantile paralysis outbreak has served to accentuate the demand for better health service. Believing that the parading of failure is a necessary step in securing improvement in this branch of public service, there are enumerated a few of the sore spots in local health administration. These are in part as follows:

1. Local board members lack interest in health work. It is obvious that no community can expect first class health work when the officials charged with the enforcement of health laws lack interest in public health problems. It is not the health department's purpose to have this apply to all local boards, but more particularly to township boards of health, where membership is acquired by virtue of election to other offices.

2. Board members lack knowledge of health work. Where interest is not lacking and even where zeal may be commendable the lack of knowledge on the part of the health board members often leads to wasteful expenditure of money and effort, and in this new occupation requiring highly specialized knowledge local health board members who attempt to do this kind of work without acquiring such knowledge are doomed to failure.

3. Many local boards of health fail to appoint trained executives. If specially trained executives were appointed failures due to lack of knowledge on the part of the board members would be avoided.

4. Part time executives fail. The bulletin expresses the belief that no matter what a man's knowledge or experience may be, he is sure to fail in public health work if he attempts it as a mere incident to his regular occupation. The part time health officer is usually a physician who depends upon his practice for a living and

does the health work merely as a side issue. A health official in this position may be called upon to prosecute some of his own patients for the violation of health laws and no community should subject its officials to the moral strain of choosing between public duty and private business.

5. Political expediency too great a factor. The mixing of politics and public health results in ineffective health work. The practice of paying political debts by appointment to membership on local health boards and to positions with such boards is severely condemned.

6. Local board members lack courage. Knowledge alone will not make a good health official unless it is backed up with moral courage.

7. Local boards lack funds for health work. In New Jersey the law provides a minimum appropriation for local health work of five cents per capita. Trained health officers cannot be employed, laboratories established, or other pressing needs provided for without sufficient funds. An appropriation for health work of from fifty cents to one dollar per capita is advocated.

8. Territorial jurisdiction insufficient to permit the most effective work. The enlargement of health administration units, either through legislative action or through coöperative organizations, in such instances where the population of a sanitary district is so small that even an appropriation of one dollar per capita would not provide sufficient funds for adequate health work, is a prime necessity in order to provide the minimum units of population required for the most economical administration of adequate local health activities. The New Jersey Department of Health advocates sanitary districts with a population of twenty to twenty-five thousand.

9. Local boards acting independently lack coördination. Under the present system health administration is a law unto itself. If the interests of society as a whole are to be best served all of these sanitary districts must work in coördination in health administration.

10. Local boards lack the support of public opinion. It is stated that with all its faults local health administration is just about as good

as the public demands. Boards of health like other public officials seldom advance much more rapidly than public opinion advances. A community that is so lacking in community spirit and so indifferent to its own best interests as to permit the appointment of incompetent, uninterested members to its board of health does not deserve more than it gets. It gets just what it deserves.

In conclusion it is stated:

"Local boards of health and the communities they serve must share the responsibility for this rather deplorable state of affairs. They must likewise share the responsibility for turning their failures into successes. In effecting these desirable changes, boards of health should take their proper place at the head of the procession, and, through health-educational activities, mold public opinion to support them in effective health work."



Result of the Sickness Survey in Boston.—The October monthly *Bulletin* of the Boston Department of Health is partially devoted to the publication of the result of the sickness survey carried out in that city last July by the Metropolitan Life Insurance Company. This was the fourth examination of this type attempted in this country. In Boston, not only the statistics of persons insured by this company were tabulated, but also statistics of a considerable number of persons not insured by the company, thus assuring a representative statistical result. It is needless to explain the benefits to be derived from such a survey; they are manifold and obvious; nor does space permit us to give the exact findings determined by this survey, though to a great extent these were most favorable. The principal findings are set forth as follows:

"1. Close to 2 per cent. of the population of Boston were found to be sick. This proportion is smaller than that registered in the surveys elsewhere.

"2. Slightly more than 90 per cent. of the total cases of sickness involved disability for work.

"3. The principal diseases responsible for the sickness registered were rheumatism, organic diseases of the heart, tuberculosis of the lungs, diseases of the kidneys and diseases and conditions of the puerperal state.

"4. The proportion of cases sick less than one

month up to the date of the survey was only 26.3 of the total. This was slightly higher than the finding for Rochester but considerably lower than North Carolina. The relatively small number of acute infectious diseases accounted for this condition.

"5. Of the total cases 72.9 received medical attention; this is a higher percentage than elsewhere. This finding reflects the excellent medical facilities of Boston. Hospitals and dispensaries provided a large proportion of the total amount of medical care.

"6. The economic loss resulting from sickness in Boston is considerable, involving the loss of earnings for about seven days per person per year."



Accuracy of Poliomyelitis Diagnoses.—

In a righteous effort to refute certain charges brought against the New York City Health Department intimating that the recent epidemic of poliomyelitis was largely a creation of the department and that a large proportion of the cases listed as poliomyelitis were not that disease at all, the Department of Health of New York in its weekly bulletin of November 18, publishes the result of the study of the diagnoses of a great many cases of this disease, thus determining their accuracy.

The large number of individuals unfortunately left with some degree of permanent paralysis is in itself sufficient to refute this absurd accusation. Thus, it is cited, that out of 2,715 cases, followed up carefully, in their homes, 1,885 were found to have serious paralysis of one or both lower limbs, and to be unable to walk; 530 more were partially paralyzed in the lower limbs, although still able to walk; 273 had one or both arms totally paralyzed.

In compiling the records of diagnoses, the study entailed some 4,474 cases sent to the hospital as "probably poliomyelitis." Of this number, 96 cases after being observed in the hospital for some time, were discharged as "no illness." In 49 additional cases the patients' illness proved to be other than poliomyelitis. Thus, disregarding the 96 cases sent in for observation as a matter of precaution, it was found that actual mistakes in diagnosis occurred in only one per cent. of the cases. There is an appended table which shows the final diagnosis of the 45 cases above mentioned, which makes it

quite clear that the symptoms of many of the conditions there enumerated resemble those of poliomyelitis, and that a prompt differentiation is often out of the question. Attention is called to the large proportion of cases manifesting meningeal symptoms, and of acute infections with respiratory symptoms. "Altogether," states the bulletin, "the figures above mentioned and the table here given testify to the high degree of diagnostic accuracy attained during the recent epidemic."



The Prosecution of Physicians, Undertakers and Midwives.—The *Virginia Health Bulletin* of October 10, makes it evident that the Virginia State Board of Health is hereafter intending to take a most strict stand on the reporting of births and deaths. The *Bulletin* comments as follows:

"Of a total of 5,026 birth certificates which reached us with the August reports, 1,197, or nearly 24 per cent. were certificates, that were not reported within ten days as provided by law, or even during the month in which they occurred. This proved that there were during August 1,197 violations of the law by physicians and midwives.

"With these facts before us, we have unwillingly, but finally, decided that the gentle and courteous measures we have used, besides putting upon the state and local registrars a large amount of unnecessary work to secure the certificates, even though late, is not appreciated by a considerable number of physicians and midwives. We are now accumulating evidence and entering upon the prosecution of violators of the law.

"Our field supervisor, Mr. Bush Wilkins, has recently secured the conviction of physicians in Northumberland and Richmond counties, with whom we had exhausted all reasonable efforts to secure compliance with the law. A number of other cases will be taken up against physicians, undertakers and midwives, in various portions of the state, as rapidly as they can be reached, and when the local registrars neglect their duty in taking action themselves.

"We are preparing to turn over to the legal authorities of Norfolk, Richmond, Petersburg and other cities, evidence sufficient to secure the conviction of a number of leading physicians.

All of these cases will receive local and general advertisement, as the convictions occur.

"To the local registrars we would say that the procedure against physicians who violate the law is as simple as trying cases of other misdemeanors. Simply summon the fathers and mothers as witnesses to the fact that the physician or midwife was in attendance. You yourself know that the birth was not reported. We welcome an appeal, as we desire to discover any weak points in the law, if they exist. Physicians should remember, however, that that involves the dragging of their confiding patrons into court as witnesses, the second time.

"This point was fully appreciated by the Richmond county mothers."



Framingham, Massachusetts, Will Be "Spotless Town of America."—Framingham, Massachusetts, will be made the Spotless Town of the United States, if the \$100,000 that the National Association for the Study and Prevention of Tuberculosis is to spend there in a community health demonstration during the next three years can make it so. Out of several hundred towns, it has been selected by a special committee for a community health demonstration that will seek to show that tuberculosis can be controlled as well as other infectious diseases, if the right methods are employed. The fund for conducting the demonstration has been donated to the National Association by the Metropolitan Life Insurance Company.

The demonstration will be started at once, under the direction of Dr. Donald B. Armstrong, Assistant Secretary of The National Association for the Study and Prevention of Tuberculosis. The committee which will have control of the work consists of Dr. Edward R. Baldwin, Saranac Lake, President of the National Association for the Study and Prevention of Tuberculosis; Dr. Lee K. Frankel, Sixth Vice-President of the Metropolitan Life Insurance Company, New York; Dr. William Charles White, Medical Director of the Pittsburgh Tuberculosis League; Dr. Arthur K. Stone, President of the Massachusetts Trustees of Hospitals for Consumptives, Boston; Dr. Stephen J. Maher, Chairman of the Connecticut State Tuberculosis Commission, New Haven; Mr. Homer Folks, Secretary of the New York State Charities Aid Association; and

Dr. Charles J. Hatfield, Executive Secretary of The National Association for the Study and Prevention of Tuberculosis, New York.

In addition to the money which the committee will spend in Framingham, that city has agreed to coöperate by improving its public health work and by offering certain special facilities for work under the direction of the committee. The leading citizens of Framingham, as well as the State Department of Health, Harvard University, the Massachusetts Institute of Technology and other schools, have offered their help in the demonstration. As part of the plan, it is proposed to place under definite control every living case of tuberculosis, both those that are demonstrably so and those that are suspected of having had contact with the disease.

As a result of this demonstration, it is planned later to use the experience in Framingham in other cities of the United States, to show that tuberculosis can be controlled anywhere.



"Study these Figures."—It is under the above title that the Chicago Department of Health in its weekly bulletin service brings before the public the following striking facts:

In 1915 there were 5,863 cases of diphtheria reported in Chicago with 678 deaths. These cases and deaths of this one disease cost the people of Chicago \$3,915,054.00, or an average cost per ward of \$111,858.00. Much of this costly sickness and suffering, due to this particular disease, could have been prevented, if only the parents had been intelligently careful in the care of their children.

Take for example, another disease common to child life, that of measles, which is usually regarded as a minor ailment. In fact many parents make the mistake of deliberately exposing their children to this disease in order that "they may have it over with." Last year there were 18,964 cases of measles in Chicago with 236 deaths. And these measles cases and deaths cost the parents of those measles cases, \$1,675,423.00, or an average ward cost of \$47,869.00. So it is easy to see that it pays to avoid contagion of every kind. It pays in dollars and cents to heed the warnings and advice of the department of health.

Then there is scarlet fever. Let us see how big a money burden it laid on the people of Chicago. Last year there were 3,366 cases

with 77 deaths—really a low mortality rate, but for all that the total cost for the year of this disease was \$978,830.00, with an average ward cost of \$27,966.00. Pity that this money, totaling \$6,569,207.00 for the three diseases named, could not have been saved. The facts are, much of it might have been saved, had only the people given their best coöperation to the health officers in their efforts to control the communicable diseases and thus to prevent needless sickness, suffering and deaths.



Campaign for "Open Window Week."—During the early part of December, in what was originally designed to be the annual observance of "Tuberculosis Week," the New York City Department of Health, in coöperation with the local antituberculosis committees, conducted an intensive educational campaign in the form of "Open-Window Week," calling attention to the value of fresh air in the prevention and cure of disease. The time was fixed at December 4 to 10, inclusive.

Special feature days were observed, as follows:

Open-Window Day—Monday, December 4.

Medical Examination Day—Tuesday, December 5.

Walk to Work Day—Wednesday, December 6.

Sanitary Workshop Day—Thursday, December 7.

Children's Health Day—Friday, December 8.

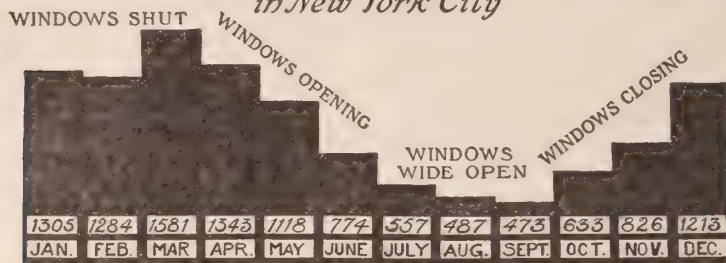
Sunshine Sabbath—Saturday, December 9.

Sunshine Sunday—Sunday, December 10.

The significance of the various days needs but little explanation. Medical Examination Day represents an annual effort to induce every one, sick or well, to have a physical examination. The intention is to popularize the movement which thousands of persons have already found to be one of the best ways of preventing serious illness.

Instead of confining the work in schools to Children's Health Day, it was expected that it would be extended to cover the entire week, and that the teachers would endeavor to interest the children in health plays, compositions and orations on matters of public health, especially fresh air in its relation to health. Importance in instructing children in personal hygiene and

DEATHS FROM PNEUMONIA, BRONCHITIS, COLDS AND GRIP in New York City



"OPEN WINDOW WEEK" DEPARTMENT OF HEALTH OF THE CITY OF NEW YORK

in what they can do to raise the health standard of their community cannot be too strongly emphasized. In connection with the work in the schools, efforts were made to furnish moving picture reels to schools having moving picture machines taking standard films.

The culmination of the week's campaign was the celebration of "Sunshine Sabbath" and "Sunshine Sunday," with special emphasis on the part of churches and religious bodies on health work. The observance of these days was an undenominational, nonsectarian movement. It has in past years, and did this year, reach Jew and Gentile, Protestant and Catholic, and all possible religious groups within these organizations. It received the endorsement of leading church dignitaries of almost every creed and denomination.



Warning against Mexico.—Due to the present disrupted state of Mexico's public health service, the California State Board of Health through its October *Bulletin* warns the public in that state of the possible, and often probable, dissemination of disease by the Mexicans coming across the border to settle in the United States. This is particularly applicable to the "squatter" camps which are inhabited by Mexicans who come into the state and occupy vacant tracts of land, and live there under the most insanitary conditions. Unless these camps are labor camps the California Commission on Immigration and Housing has no jurisdiction over them, and then the matter is in the hands of the local health officers. As a consequence unless a thorough cleanup of all Mexican quarters is accomplished,

there is the possibility of the cities and counties of southern California becoming overrun with typhus fever. Smallpox also comes into notice. Since the Mexicans are not now generally vaccinated, cases of smallpox among them may not necessarily be of the mild form as experienced in cases of that disease in a well vaccinated territory. Already two deaths have occurred from severe cases of smallpox imported from Mexico, and the issued warning seems to be most timely and important.



Order Body Louse into Quarantine.—Flies, mosquitoes, fleas, ground squirrels and rats have long been recognized in California as carriers of disease, and now the State Board of Health has declared the unmentionable body louse (*Pediculus vestimenti*) a menace to the public health. Because this insect transmits typhus fever, twenty-five cases of which have recently been brought into California from Mexico, the board has instructed health officers to quarantine any persons or premises known to be infested with body lice, until complete delousing has been accomplished.

In addition, the board has ordered local health authorities to quarantine premises for pediculosis, the classical name for louse infestation, placarding same with a sign which reads:—"PEDICULOSIS. These premises are declared to be in a state of quarantine. All persons are forbidden to enter or leave these premises or to remove any articles therefrom without the permission of the local health authority."

Lodging house keepers, employees, teachers, school nurses and any others who have knowl-

edge that certain persons and premises are infested with body lice are told by the board to report the fact to the local health authority. So, if the *Pediculus vestimenti* is wise, he will make himself scarce in California.

Because of the fact that epidemics of typhus rise suddenly, generally affecting large numbers of persons within a short time, extreme precautions in the prevention of the disease are essential. Because of the fact that most people in California live under favorable economic and hygienic conditions, the danger presented by typhus is not great, but it is necessary that all insanitary lodging houses, camps, etc., as well as the persons occupying such places, be thoroughly cleaned. Then there should be no trouble in the control of typhus fever in California.



Needless Killing.—The following severe arraignment is made by the Indiana State Board of Health in one of its recent bulletins against the people of Indiana, and indeed it is quite applicable to people throughout the United States:

"Of course, the killing now going on by explosives, gases and liquid fire in Europe, is needless, and so also is the killing annually of about 10,000 citizens of Indiana by preventable diseases. Killing by explosives and killing by preventable diseases are results of stupidity. If we were not so stupid we wouldn't do it. There is the nasty typhoid fever. Its prevention is known, but we won't prevent. It kills 1,000 annually in Indiana and attacks 25,000. It costs the people not less than \$2,000,000 each year and for \$200,000 we could put it out. Isn't it stupid not to do it? Then there is consumption. It kills 4,300 annually and its prevention

is known, still we won't prevent. It costs the people \$10,000,000 annually and yet the last legislature, upon motion of a lawyer member, struck from the antituberculosis law the \$2,500 intended for its enforcement. Wasn't that stupidity? If not, what in the name of common sense was it? It surely wasn't economy. Then again, there is diarrhea and dysentery; they kill about 2,000 babies annually under five years of age. We bury them in little white coffins, cry and mourn over them, and wickedly blame the disaster on God. We are to blame, for diarrhea and dysentery result from wrong feeding. We simply don't feed the babies good food. Diarrhea and dysentery are the results of food poisoning. It is certainly stupid for the people of Indiana to poison 2,000 little children annually. Then again, there are those other killers called diphtheria, scarlet fever, pneumonia, etc. They kill over 3,000 annually and they can be controlled. Why don't we control them? Isn't it stupidity not to stop the killing if we can?

"In a certain county forty-nine cases of trachoma were discovered among the school children. Their parents were kindly informed and told the children would almost certainly go blind if not cared for. Three weeks after the letter was sent, investigation discovered that not a parent had taken the proper steps to cure the disease and save the children's eyesight. When the health officers asked the parents why they didn't look after the eye disease and save the children from blindness, they answered, 'You are cranks.' But hurling epithets won't stop trachoma. To better a community first get rid of its morons."

Public Health Notes.

A Health Exhibit for Men at Coney Island.—The summer season at Coney Island was important from the social hygiene point of view by reason of an experiment in adapting the methods of the venereal diseases quack to legitimate public health work through a "Health Exhibit for Men" prepared and maintained by the New York Social Hygiene Society. This exhibit dealt with venereal disease and was open from July 20 to September 20. The American Social

Hygiene Association, the New York City Department of Health, the Brooklyn Hospital Dispensary, and the Medical Society of the County of Kings gave it their support and cooperation.

The purpose of the exhibit was largely educational. It presented the facts of venereal disease by pictures, models, cartoons, and printed matter, dealing with the nature of syphilis and gonorrhea, their means of contagion,



filthy drains and sewers and feeds on garbage, has yet found it necessary for his health's sake to be most careful to preserve himself from defilement. He has also an intolerable dislike to the presence of insects in his coat. Further, he has a marked objection to tar, and advantage has been taken of this, amongst other means, to induce him to quit. It is only when the rat is aged or sick that he becomes careless of his toilet and begins to harbour fleas and other vermin.

"Rats are found to be more susceptible of plague than even human beings, and it is almost invariably noticed that an epizootic of this disease amongst the rat population precedes an epidemic amongst human beings. At such times rats are found dying in great numbers on the wharves and in the grain stores by the sea coast, having been infected by the incoming ships, and they may be seen, as I have witnessed in Poona city streets, struggling along the curb, some sick, some apparently healthy, the latter tamely running up and down in the bright sunshine in a peculiar aimless and bewildered man-

ner, and occasionally one here and there overcome by the disease rolls over on his back and literally turns up his toes. It is a great mistake to make light of these warnings of the approach of an epidemic. A plague authority in Poona did so, and men were dying at the rate of 200 a day in the city a few weeks after.

"The remedies are: The people must clear out at once on finding dead rats; houses must be suitably disinfected; the rats must be microscopically examined for plague bacilli.

"Strict cleanliness with free ventilation was insisted on at all times in the plague hospitals at Belgaum, and constituted the main safeguard against infection of the relatives and attendants.

"The Flea.—It is said that fleas have a predilection for particular species of animals, and many varieties of dog fleas, cat fleas, rat fleas, the *Pulex irritans* and the *Pulex penetrans* or jigger have been described, all only too commonly met with in Jamaica. However, the opinion now appears to be gaining ground that although rat fleas will remain upon rats until

their particular host dies, yet, the circulation then ceasing and the body becoming cold, these insects, being only 'true till death,' soon skip off lively and hasten to search elsewhere for their accustomed nutriment. They will probably seek for another rat, but if on their journey they come across another animal, possibly a man, they promptly make a meal off him, and, by way of exchange, infect him with plague. So it is that when rats are dying in large numbers before an epidemic of plague, unattached fleas are found in abundance, and it is inadvisable to walk about on bare feet. . . .

"Adult fleas are sucking animals and take their food in liquid form. Poisons, such as arsenic, which act on the stomach, are clearly useless against insects, unless put in liquid food, which is impossible, and, as in the case of all insects, the use of a contact poison is necessary—one that will kill the insect on coming into contact with the skin. The flea is covered with chitin, a hard substance peculiarly resistant to chemicals, and which is not acted on by any substance generally applicable.

"There is but one way in which such an insect as a flea can be attacked, and that is by using a substance that will affect the breathing system; this opens at the sides of the body in minute air-holes, and it is known that some substances will kill insects through these openings.

"The absolute destruction of fleas can be generally effected best by thoroughly washing the floors and walls with a suitable emulsion—the best insecticide being crude oil emulsion."

*

United States 1915 Mortality Statistics.—

According to a preliminary announcement with reference to mortality in 1915, issued by Director Sam. L. Rogers, of the Bureau of the Census, Department of Commerce, and compiled under the direction of Mr. Richard C. Lappin, chief statistician for vital statistics, nearly one-third of the 909,155 deaths reported for that year in the "registration area," which contained approximately 67 per cent. of the population of the entire United States, were due to three causes—heart diseases, tuberculosis, and pneumonia—and nearly two-thirds were charged to twelve causes—the three just named, together with Bright's disease and nephritis, cancer, apoplexy, diarrhea and enteritis, arterial diseases,

diabetes, influenza, diphtheria, and typhoid fever.

The deaths from heart diseases (organic diseases of the heart and endocarditis) in the registration area in 1915 numbered 105,200, or 156.2 per 100,000 population. The death-rate from this cause shows a marked increase as compared with 1900, when it was only 123.1 per 100,000.

Tuberculosis in its various forms claimed 98,194 victims in 1915, of whom 85,993 died from tuberculosis of the lungs. The progress made in the prevention of this dreaded malady during recent years has been most gratifying. In only a little more than a decade, from 1904 to 1915, the death-rate from tuberculosis in all its forms fell from 200.7 to 145.8 per 100,000. This is a drop of more than 25 per cent. Even yet, however, tuberculosis has the unenviable distinction of causing more deaths annually than any other form of bodily illness except heart diseases, and about 46 per cent. more than all external causes.

Pneumonia (including bronchopneumonia) was responsible for 89,326 deaths in the registration area in 1915, or 132.7 per 100,000. This rate, although lower than for most of the years from 1900 to 1911, inclusive, is higher than for 1912, 1913, and 1914.

The only remaining death-rate higher than 100 per 100,000 in 1915 was that for Bright's disease and acute nephritis, 104.7. The mortality rate from these two causes increased from 89 per 100,000 in 1900 to 103.4 in 1905, fluctuated more or less between 1905 and 1912, and has shown little change since the last-mentioned year.

Next in order of deadliness come cancer and other malignant tumors, which caused 54,584 deaths in 1915. Of these, 21,221, or nearly 39 per cent., resulted from cancers of the stomach and liver. The death-rate from cancer has risen from 63 per 100,000 in 1900 to 81.1 in 1915.

Apoplexy was the cause of 53,397 deaths, or 79.3 per 100,000. The rate from this disease has increased gradually, since 1900, when it stood at 67.5.

Diarrhea and enteritis caused 48,325 deaths in 1915, or 71.7 per 100,000. This rate has shown a marked falling off in recent years, having been 90.2 in 1913 and 79.4 in 1914; and has declined very greatly as compared with the

corresponding rate for 1900, which was 133.2. Nearly five-sixths of the total number of deaths charged to these causes in 1915 were of infants under 2 years of age.

Arterial diseases of various kinds—atheroma, aneurism, etc.—caused 15,685 deaths in 1915, or 23.3 per 100,000. This rate, although somewhat lower than the corresponding ones for 1912 and 1913, is higher than that for 1914, and is very much higher than that for 1900, which was 6.1.

Diabetes was the cause of 11,775 deaths, or 17.5 per 100,000. The rate from this disease has risen almost continuously from year to year since 1900, when it was 9.7 per 100,000.

Influenza caused no fewer than 10,768 deaths in the registration area in 1915, the rate being 16 per 100,000. The rate from this malady, which fluctuates very considerably from year to year, was higher in 1915 than during several years preceding, but was somewhat lower than the average between 1901 and 1910.

No other epidemic disease produced a death-rate as high as 16 per 100,000 in 1915. The fatal cases of diphtheria and croup—which are classed together in the statistics, but practically all of which are of diphtheria—numbered 10,544, or 15.7 per 100,000, in that year, the rate having fallen from 43.3 in 1900.

The mortality rate from typhoid fever has shown a most gratifying and remarkable decline since 1900, having dropped from 35.9 per 100,000 in that year to 12.4 in 1915, the decrease amounting to nearly two-thirds. This decline is greater, relatively, than that shown for any other important cause of death. The total number of deaths due to typhoid fever in 1915 was 8,332. Improved methods of sanitation, including the betterment of the water supply and sewerage systems, the campaign against the fly, and other preventive measures, have proved their efficacy in a striking manner by a reduction of almost two-thirds in the typhoid death-rate during a period covering but a decade and a half.

The principal epidemic maladies of childhood—whooping-cough, measles, and scarlet fever—were together responsible for 11,489 deaths of both adults and children, or 17.1 per 100,000, in the registration area in 1915, the rates for the three diseases separately being 8.1, 5.4, and 3.6, respectively. In 1913 measles caused a greater mortality than either of the other diseases, but

in 1914 and 1915 whooping-cough had first place. In every year since and including 1910, as well as in several preceding years, measles has caused a greater number of deaths than scarlet fever. The mortality rates for all three of these diseases fluctuate greatly from year to year. The rates for measles and scarlet fever in 1915 were the lowest since 1900, while that for whooping-cough was somewhat above the lowest recorded rate for this disease, 6.5 in 1904, although far below the highest, 15.8 in 1903.



Anthrax in Shaving Brushes.—*The Medical Officer*, London, of October 21 reports the finding of anthrax spores in a number of shaving brushes sold in London. The bristles were composed of mixed hair of Chinese origin, chiefly horse, pig, goat and human hair.

The investigation was the outcome of a fatal case of anthrax in a man who had nothing to do with animals, hides, wool or skins. Inquiry developed the fact that a new shaving brush had been recently purchased. Not only this brush, but also the rest of the chemist's ("druggist's") stock of six brushes were found to be infected.

Four other cases of anthrax were found outside of London that were traced to the same shipment of brushes.

"But for the timely discovery of Doctor Elsworth the pathologist, and the subsequent administrative action taken, an outbreak of more serious dimensions might have resulted."



Rapid Differentiation of the Bacilli of the Typhoid Colon Group by Means of Test Papers (Hollande and Beuverie, *Comp. Rend. de la Soc. Biologie*, vol. lxxviii, p. 722).—For the differentiation of the *Bacillus typhosus*, *B. paratyphosus* A and B, and *B. coli*, the authors employ four test papers which they prepare as follows: (1) A piece of filter paper is dipped into a 1 per cent. solution of silver nitrate and is then quickly dried, it is then dipped into a 10 per cent. solution of collodion in equal parts of alcohol and ether drained and dried in the dark; (2) a filter paper is dipped into a 1 per cent. watery solution of neutral red containing 10 per cent. glucose and then dried and impregnated with collodion as before; (3) the filter paper is dipped into a 10 per cent. watery solution of lead subacetate dried and treated as before with collodion; (4) a paper is dipped into the following solution:

0.2 grm. litmus, 4 grm. neutral sodium phosphate, 5 grm. lactose, 1 grm. sodium bicarbonate, 50 c.c. distilled water; it is then dried and again treated with collodion. For use portions of these prepared papers are dropped into peptone broth tubes which are then autoclaved at 118° C. for twenty minutes. The authors state that the following results are obtained: (1) With the silver nitrate paper a growth of *B. coli* is obtained in twelve hours, of the three other bacteria in two or three days; (2) with neutral red paper the red colour of the paper and broth are unchanged by *B. typhosus*, the paper remains at the bottom of the tube and there is no gas formation. With the three other organisms the colour changes to canary yellow and gas is formed between the collodion and the paper and the latter then floats to the surface. Lead acetate paper is blackened after about twenty hours, except in the case of *B. paratyphosus* A, in which no change occurs. With the litmus lactose paper the lilac colour of the paper and broth is discharged after twenty hours, but in three days the colour returns in the case of the *B. paratyphosus* B.—*Journal of State Medicine* (London), November, 1916.



Destroying Lice on Typhus Fever Suspects.—Typhus is endemic in Mexico and a serious factor on the battlefields of Europe. Surgeon S. B. Grubbs of the Public Health Service in *Public Health Reports*, October 20, describes methods based upon experiments of the Boston quarantine service of treating suspected immigrants and their baggage to destroy lice, which transmit the disease.

Persons are sprayed with a solution consisting of:

Soap chips or laundry soap. Part 1.
Soft water. Parts 4.
Gasoline. Parts 4.

After being well soaped, they are showered with clean water.

Meanwhile, clothing and baggage are treated with hydrocyanic acid gas in metal chambers. The air is first partially exhausted by means of a vacuum of 15 to 17 inches, after which the prussic acid is admitted and exposed to the personal effects for 30 minutes. The gas is then exhausted again.

Baggage need not be unpacked, the gas penetrating through cracks.

The method is said to be safe and convenient, and is recommended for lodging-houses and similar institutions for destroying vermin in clothes and bedding.



Rural Work in Child Hygiene.—Why are there so many deaths among country babies and country mothers? And what should the federal government do about it? Miss Julia C. Lathrop in her fourth annual report as chief of the Children's Bureau describes its new rural studies of child and maternal welfare which combine a scientific inquiry with work of immediately practical value to the children of the neighborhoods visited, and suggests a constructive plan for the future.

The report gives many reasons for extending this rural work. First, the Census Bureau's figures show average infant mortality rates in the rural districts higher than the mortality rates found by the Children's Bureau in the more prosperous sections of the cities which it has studied.

Again, the census figures show a markedly high death-rate among country women of child-bearing age for which a larger number of preventable deaths from maternal causes appears to be responsible. It is estimated that more than 15,000 women die year by year in the United States from conditions incident to maternity, while the extent of unnecessary ill health is at present unknown. "The sickness or death of a mother inevitably lessens the chances of her baby for life and health, and it is plain that the question of maternal care in rural districts is of genuine public interest."

An argument for better care of rural childhood is based on the high percentage of physical defects among children in rural schools given in reports of state boards of health. Miss Lathrop concludes: "These comparisons are a strong indication that there is room for great permanent improvement in maternal and child welfare in rural districts. The day when all children shall be well born and well cared for is far ahead, but surely that day should dawn first for the country."

In connection with the bureau's rural studies a child hygiene expert holds a children's health conference to which parents bring their children for examination and advice about daily care (but not for medical diagnosis or treatment).

Parents have shown great eagerness for this kind of help in the counties already visited, bringing their children often long distances, over bad roads, and even sacrificing farm work for the journey.

State and other local officials are urging the bureau to coöperate with them in similar studies and demonstrations in many states, and a number of rural units to extend this work are among the items for which the bureau asks a larger staff and appropriation. Miss Lathrop believes that such federal studies, making plain the necessity and suggesting a method are bound to lead toward adequate local provision for maternal and child welfare.



Public Health Education.—W. C. Rucker Washington, D. C. (*Journal A. M. A.*, November 11, 1916), says that publicity if properly managed is bound to do good. The chief criticism of what has been done in the past in the way of enlightening the public on the need of sanitation is that it has been too spasmodic and temporary. Too much dependence has been placed on the spoken word; while there has been an enormous amount of speech making and agitation, especially in times of great public danger, the results have too often been only temporary. What the American people want is more demonstration and less talk. Demonstration takes many forms, two of which are here especially noticed, namely, stereopticon slides and motion picture films. These two methods are very good, particularly in the education of children, but the effects lack permanency to a certain degree. The stereopticon lecture must be accurate and also entertaining; the lecture should be effective enough to do without the assistance of the slides and the slides should be good enough to tell their own story. The stereopticon form of demonstration is relatively cheap and that there is a demand for it is shown by the results achieved by the stereopticon loan library of the Public Health Service. The demands on it are enormous and it has been the means in the past year of reaching several million people, and there is no doubt that it has aided in spreading the gospel of sanitation. Moving picture films have not on the whole brought as good results as were expected. People do not go to the movies to be educated as a rule, they go for amusement instead, and the moving picture operators cater

to this demand. The sanitary scenario must be sugar coated and live up to the traditions of the moving picture stage, and Rucker does not have any great expectations in its future sanitary instructions. It is surprising, he says, how much good can be obtained through well prepared charts, and well made models are most excellent but they are expensive and the uninterested public will not come to see them in great numbers. Those which contain a puzzle which will make people stand in front and wonder how they operate are very efficient. Printer's ink is the great medium of public health education. Newspaper articles should be written with an absolute absence of medical terms. They must be convincing and still tell the story. Special articles in magazines are of great value and special bulletins are another valuable method provided they can be made to reach the people. The demonstration, however, which is of the greatest value is that which shows to the public just what can be accomplished by sanitation. The health officer who attacks a certain situation and conquers it produces an effect which is lasting, such as the people of New Orleans, for example, have had in the conquest of yellow fever and those of San Francisco in the handling of bubonic plague. The great sanitary hope of the future, Rucker says, is the education of the child today.



Sanitation in the Philippine Islands.—Gratifying progress is reported in sanitation of the Philippine Islands, as a result of the work of the Sanitary Commissions.

"The first period," writes Surgeon J. D. Long, in *Public Health Reports* of October 27, "or that of the elimination of grave epidemic diseases, extended from the beginning of the American occupation to and including the year 1908. During this period the principal efforts of the health authorities were directed toward controlling outbreaks of cholera, systematically vaccinating the inhabitants to get rid of smallpox, and taking measures to eliminate bubonic plague. The results have been satisfactory in that smallpox and plague have been, for all practical purposes, eliminated, and cholera has been so effectively controlled that it can no longer be considered a menace and, it is believed, can never again assume serious epidemic proportions.

"The second period, or that of constructive sanitation, began in 1906, when investigations were begun with a view to improving the general water supply of the islands."

As early as 1906, the problem of sewage disposal was approached. "Numerous attempts have since been made to solve the question by the use of pits, the installation of pail systems, and by various other methods. Generally, however, the results obtained were worse than the original condition, on account of the fact that proper care was not taken and serious nuisances were created."

Studies in 1915, however, showed that in spite of the previous activities, mortality and morbidity rates were still too high. In order to meet the need for accurate information, it was decided to form sanitary commissions.

The first commission was placed in the field at Pasig, Rizal, in June, 1915. It was composed of a physician, an engineer, a bacteriologist, district nurses and a sanitary inspector.

The census showed that the population of Pasig was 14,752.

"The mortality per thousand inhabitants was, during the year 1914, 36.64, as compared with 82.4 in 1903. The high rate in 1903 was due to the presence of cholera, which did not exist in 1914. Eliminating cholera, therefore, in order to place the two rates upon the same basis, the corrected rate for 1903 was shown to be 68.2 per thousand per annum.

"The increase in population was shown to be due almost entirely to immigration, as during the entire period the difference between the birth and death-rate averaged only about 1 per cent. in favor of the birth rate.

"The principal factors which contributed to the spread and extension of diseases were determined to be as follows:

"In adults, respiratory diseases were caused by faulty personal hygiene, lack of ventilation, failure properly to dispose of sputum and pulmonary excretions, overcrowding in houses, particularly sleeping quarters, and lowered vitality due to lack of a properly balanced and nutritious diet."

The water supply was found to be bad, only 26 per cent. of the inhabitants having a satisfactory supply.

Improper care and feeding of infants was widespread, and examination of breast-milk of

mothers showed remarkably high bacterial contents, the counts in 11 samples ranging from 10,000 to 120,000 per c.c.

It is proposed to install a water distribution system, using an artesian well supply. Sewage disposal will be accomplished by means of specially designed outhouses.

A study of diets is being made with a view to furnishing instructions later on.



New Public Health Association in Connecticut.—The Connecticut Public Health Association came into existence at a meeting held in New Haven on December 6. The attendance of persons from throughout the State was very encouraging. The organization of the Association will undoubtedly mean much for the progress of public health endeavor in Connecticut.



Sweets and Children's Teeth.—"Sweets should never form the last part of a meal," says Dr. J. H. Gibbs in the *Journal of State Medicine* (London). Sugar gives rise to acids, which decay teeth. Sugary foods are best omitted from a child's diet, he thinks, the starches furnishing all the carbohydrate that is required. However, if we must eat sweets, it is best to let acid fruit or an acid wash be the last part of the meal, as the acid stimulates a flow of saliva, which not only cleans the teeth, but renders the surface alkaline, thus preventing decay.



Hydrophobia in Alaskan Foxes.—The fallacy that rabies is solely a hot weather disease is well disproven by the following incident, which was originally published in *The Military Surgeon*, and reprinted in the *Medical Record* of November 4th:

"Captain Ferenbaugh, United States Army, mentions the fact that so-called crazy foxes were seen in the Yukon Delta region in the spring of 1915. With mouths hanging open and dripping with foam they would approach settlements and try to bite the dogs. Demented, stiff, and emaciated, they were easily killed. Nevertheless five dogs were bitten and succumbed to rabies. In the interior of Alaska the disease seems to have been unknown until 1914, when a man died of the disease three weeks after the bite of an Esquimaux dog. During the

crazy fox episode a soldier was bitten by one of the infected dogs. He was hurried to San Francisco, took a Pasteur cure and has since remained well. The Esquimaux have in general regarded the craziness of the fox as the result of starvation. But any naturally shy animal which unprovoked attacks men and dogs is best regarded as rabid."



No Goods on Approval.—Commenting on an ordinance recently passed in San Francisco, Cal., the *New York Medical Record* says:

"After all, it is an unwelcome thought to think of trying on socks, shirts, and underwear that may have been through the same process on the person of one suffering with syphilis, gonorrhea, skin disease, tuberculosis, or even lice. Los Angeles would do well to pass a similar law, as it would do a whole lot to stop the spread of contagious disease."



Anti-Vaccinationists Discover the Cause of Polio.—Following is an extract of a letter which Dr. Samuel B. Woodward, President of the Massachusetts Medical Society, says was mailed to him by Mr. Jassica L. C. Henderson of Boston, Vice-President of the Anti-Vaccination League of America:

"The psychological moment to repeal the Compulsory Vaccination Law is the next session of the legislature,—owing to the tremendous excitement over infantile paralysis which many experts believe is the inevitable outcome of generations of vaccination.

"We need money. If everyone in sympathy with our cause will do what they can to help we can win out this year!

"Last year we practically won with a vote of 127 in our favor to 105 against, at the second reading of the bill. This was the largest roll-call in the history of the commonwealth, not even excepting the election of the speaker of the house. I mention this to show you the tremendous interest in and pressure brought to bear on our measure. At the third reading of the bill the opposition brought every ounce of their power against us, and we only lost by a few votes. Therefore we have reason to feel proud of the splendid fight we made!"

The letter is printed in full in the *Boston Medical and Surgical Journal* of November 9,

together with Doctor Woodward's accompanying letter, which is given below:

WORCESTER, Oct. 30, 1916.

Mr. Editor:—

The enclosed letter with its startling contribution to the etiology of infantile paralysis deserves publicity were it only to emphasize the colossal impudence of the person who signed it.

Its third paragraph does, however, state the exact truth and I wish at this time to call upon every member of the Massachusetts Medical Society to constitute him- or herself a committee of one to interview those who are to be members of the next legislature, to impress upon them the importance of retaining the present law and the punishment sure to follow its repeal.

Very sincerely,

SAMUEL B. WOODWARD, M. D.,
President, Massachusetts Medical Society.



Mottled Enamel and Brown Stain.—Surgeon F. C. Smith of the Public Health Service, *Public Health Reports*, October 20, calls attention to this defect in the teeth of inhabitants of certain areas.

"This condition is confined to certain geographical areas, of which the following are known: The Salt River and the Gila Valleys in Arizona, the territory affected extending also into old Mexico; an important section in Colorado, including the city of Colorado Springs and rural districts above and below this city on Fountain Creek; small regions in Texas, Virginia, California, South Dakota, and South Carolina, respectively; and probably areas in Oregon, Washington, Idaho, Montana, Alaska, and near Port Henry on Lake Champlain."

The stains, we are told, "are due to a defect in the formation of the enamel caused by the absence of cementing substance occurring normally between the enamel rods in the outer third of the enamel layer. The outer glazed enamel surface, Nasmyth's membrane, is however always normal. When there is a simple lack of the cementing substance, the portions affected contain only air and show through Nasmyth's membrane as a dead opaque white, but when deposits of coloring matter, called brownin by Doctor Black, occur, the teeth appear to be stained yellowish, brownish, or even black, in varying degrees according to the

amount of the stain present in the spaces between the enamel rods. Dental caries is apparently not more frequent in teeth so affected, although repairs are made by the dentist with more difficulty when caries occurs."

The cause is thought to be chemical—possibly some of the rarer elements present in traces in the drinking water.



First Examination of the National Board of Medical Examiners.—The National Board of Medical Examiners held its first examination from October 16 to 21, in Washington, D. C.

There were 32 applicants from 17 states, representing 24 medical schools, and of these 16

were accepted as having the necessary preliminary and medical qualifications, 10 of whom took the examination.

The following men passed: Dr. Harry Sidney Newcomer, Johns Hopkins University; Dr. William White Southard, Johns Hopkins University; Dr. Orlow Chapin Snyder, University of Michigan; Dr. Thomas Arthur Johnson, Rush Medical School; Dr. Hjorleifur T. Kristjanson, Rush Medical School.

The second examination will be held in Washington, D. C., June, 1917. Further information may be had by applying to Dr. J. S. Rodman, Secretary, 2106 Walnut St., Philadelphia, Pa.

Industrial Hygiene and Sanitation.

Occupational Diseases Discussed at the Annual Meeting of the American Chemical Society.—Some extremely interesting papers on occupational diseases were presented at the recent annual meeting of the American Chemical Society held in New York City. The material contained in each of these papers is of sufficient value to bring it to the attention of members of the Association. It would be difficult to find a more competent set of men than those which took a part in the symposium. The papers deserve a much more thorough discussion than space permits, and only a few of the many excellent points brought out by the authors are given in the following abstracts:

Charles Baskerville, in a paper entitled "Occupational Diseases in the Chemical Trades" discussed the attempt of dealing with occupational diseases here and abroad historically. The New York Section of the American Chemical Society appointed a committee on occupational diseases in the chemical trades in February, 1912. This committee was to advise the State legislature and to investigate existing conditions. The relation of manufacturers and workmen is not always as may be desired. The selfish group of manufacturers is fortunately relatively few in numbers. It is hoped that congress will enact a Federal Workmen's Compensation Law. All new processes should be studied from the standpoint of possible health hazards. A greater extension of the work on these lines by the

Public Health Service at Washington, the Bureau of Mines, and the Department of Labor is urged. A Museum of Safety should be established at Washington.

Dr. J. W. Schereschewsky, in a paper entitled "Prophylaxis" states that the necessity for adequate protection of the health of chemical workers is self-evident. In no industry is the worker more exposed to varied and manifold injuries to health. In 1914 the value of the product of the general chemical and allied industries amounted to \$1,228,403,984, an increase of 53 per cent. over the 1909 figure. Of the ordinary health hazards in this industry may be mentioned defective illumination, ventilation, extremes of heat and cold, long hours and inadequate factory sanitation. The list of specific hazards is a long one. There are poisons which act superficially, blood poisons and poisons with definite internal action, a so-called remote or specific effect. Poisonous fumes and gases may belong to any of the three groups mentioned. We have to distinguish between irritating and toxic effect. Among the metallic vapors the most poisonous are those of mercury and lead. Of the dusts the most poisonous is lead. Unfortunately no data is available of the morbidity in the chemical industries in this country. German figures show a high morbidity and fatality rate. One large chemical company has requested the Federal Public Health Service to undertake a survey of its establishments with a

view of improving conditions and it is hoped that others will follow.

In a paper entitled "Industrial Poisoning from Aniline and Allied Products," the author, George P. Adamson, states that aniline poisoning in the United States was, until the present foreign disturbance, given but slight attention. The introduction of the manufacture of nitrobenzol and aniline in this country brought very quickly to the attention of manufacturers and physicians the necessity for precautions. The serious cases come from the absorption, caused by the splashing, of the oil on the body without removing the same by immediate washing. Cleanliness is an absolute necessity, and bathing before leaving the plant should be positively required, also washing of hands and face before eating. A man may become poisoned by the oil being absorbed through worn-out soles. Wooden soled shoes are now provided. Each workman should undergo a physical examination before entering the industry. Adamson describes nine cases of poisoning which he personally observed. The result of blood examination showed a reduction in haemoglobin and red cells. If the haemoglobin falls below 70 per cent. the man should be advised to seek other employment. Symptoms, treatment and prophylactic measures are described by various physicians employed in the aniline oil industry.

Dr. W. A. Lynott described the Studies of Occupational Diseases made by the Bureau of Mines. The first studies made by this Bureau were undertaken in connection with the hook worm disease and pulmonary troubles, particularly silicosis, among miners and metallurgical workers. A. J. Lanza and E. Higgins made an exhaustive study of pulmonary diseases and its relation to rock dust in the miners among the mines in the Joplin (Mo.) District in 1915. The influence of siliceous rock dust in the lead and zinc mines was investigated in particular. The records of the State Board of Health for the calendar year 1912 showed a death-rate from pulmonary tuberculosis in Jasper County, Mo., of 200.8 per 100,000 population. It was found that the siliceous dust was largely responsible for the disease. Tuberculosis among coal miners is uncommon. "Miners' asthma" is very rare at present time due to the better ventilation of the mines. Dr. H. W. Gillett investigated

the disease known as "brass founder's ague" or "smelter chills." There is no specific remedy. The most probable cause is zinc oxide, the main constituent of the fumes. The disease is seldom if ever fatal. To prevent "shakes," the zinc fumes must not be allowed to enter the nose or mouth. In plants where alloys high in zinc are poured only occasionally the wearing of respirators during such pouring should be made compulsory. Dr. F. T. Hoffman made an extensive study of miners' myasthenia. He claims that the disease is due to a peculiar form of eye strain. It occurs in about 5 per cent. of the European coal miners. The prognosis is usually good but change of occupation is advisable. Dr. J. A. Watkins of the United States Public Health Service investigated health conditions of the steel mills, and urges medical supervision of employees and makes a number of other suggestions relative to sanitation.

Dr. Alice Hamilton in a paper entitled "Dangers Other than Accidents in the Manufacture of Explosives" relates the results of her investigation of some forty plants. Some thirty to thirty-five poisonous substances were encountered, among them hydrochloric, nitric, sulphuric acids, and a large number of benzol derivatives. In addition there are mercury salts, wood alcohol, ether, amylacetate, tetra-chlor-ethane, and others. By far the most important poisons are the oxides of nitrogen, the so-called nitrous fumes. The fumes are worst in the nitrating of cotton and of phenol. Bronchitis and pneumonia may follow the exposure to such fumes. There are many hastily and poorly constructed picric acid plants, sometimes just to fill a single war contract, and carried on without reference to the fundamental conceptions of hygiene. In gun cotton manufacture, once the nitration is over, the only danger is from the solvents. "Ether jags" are frequent. The nitro and amido compounds of benzene and toluene give rise to a very well defined and characteristic form of poisoning. The worst cases from nitrobenzene and from aniline seem to come from spilling the fluid over skin or clothes. The susceptibility of workers to the various forms of poison varies greatly.

These papers may be found in full in the *Journal of Industrial and Engineering Chemistry*, November, 1916.

Effects of the "Safety-first" Campaign.—That the "safety-first" campaign, inaugurated a few years ago, has borne good fruit is brought out by the figures for accidental deaths, as recently prepared by the Bureau of Census, Department of Commerce, in the 1915 United States Mortality Statistics. For 1913, 54,011 deaths were reported as due to accident; for 1914 the corresponding number was reduced by 1770, and for 1915 to 51,406; and during this period there was not only an increase in the population of the registration area as it existed in 1913, but an increase in the extent of the area itself. The rate per 100,000 population for accidental deaths fell from 85.3 in 1913 to 78.5 in 1914 and to 76.3 in 1915. There has been a very considerable reduction in fatalities due to railway, street-car, mine, and machinery accidents, and the increase in those resulting from automobile accidents has not been as rapid as the increase in the number of machines in use.

Deaths due to railway accidents and injuries totaled 6,652 in the registration area in 1915, or 9.9 per 100,000. This number includes fatalities resulting from collisions between railway trains and vehicles at grade crossings. This death-rate is the lowest on record and shows a marked decline during the past 10 years.

Deaths resulting from street-car accidents and injuries numbered 1,555, or 2.3 per 100,000. This rate, like that for railway fatalities, is the lowest on record and shows a material falling off during the past 10 years.

Automobile accidents and injuries caused 3,978 deaths in 1915, or 5.9 per 100,000. There has been an increase in this rate from year to year, but, as already mentioned, the increase has not been so rapid as that in the number of machines in use.

The number of deaths from mine accidents and injuries in the registration area in 1915 was 2,009, corresponding to a rate of 3 per 100,000. This rate shows a material decline as compared with the corresponding figure for 1913, 3.6, and very great decline as compared with that for 1907, 4.8, which is the highest on record.

Deaths caused by machinery accidents in 1915 numbered 1,257, or 1.9 per 100,000. This rate also shows a marked decline during recent years, the corresponding figures for 1913 and 1914 being 2.4 and 2, respectively. The highest recorded rate from this cause is 2.5, for 1907.

Dangers from Automobile Exhaust gases.—

If it were possible to collect all those instances in which persons have suffered ill effects from the inhalation of exhaust gases from automobiles we would probably find that many accidents and not a few deaths have resulted from this cause. The direct cause of petrol asphyxia appears to be the carbon monoxide in the exhaust gases as a result of the imperfect combustion of the petrol, or as we commonly use the term, gasoline. In a perfect mixture of air and gasoline the gasoline is entirely consumed but under average conditions a perfect mixture is rarely secured. As a rule the mixture as admitted to the engine through the carburettor, is set for road use. While the amount of gasoline thus employed may serve very well for propelling the vehicle under a load it will probably prove to be too "rich" when the engine is running idle. For this reason the exhaust gases from the engine as it runs idle in the garage or on the street contain a material quantity of carbon monoxide, sufficient if ventilation is not provided to cause ill effects or even death. If an engine is to be allowed to run in a garage especially in the small private garages where air space is limited, provision should be made for free ventilation by allowing both doors and windows to remain open.



Labor and the Stop Watch.—The following clear and excellent statement on methods of scientific management, appears in a recent issue of the *Youth's Companion*.

"The fact that congress has prohibited the use of stop watch systems of scientific management in government factories and supply depots is a sign of the times that deserves more attention than it has received. The purpose of the various efficiency methods generally referred to by the term 'scientific management' is to increase the production of a manufacturing establishment by eliminating all causes of delay, so that each operative may work continuously at his especial task and with the least possible friction. There is no restriction on his output and for the increased production he receives additional pay in the form of a premium or bonus. The results obtained by applying superior intelligence in planning the workman's task have been astonishing.

"The objection on the part of labor to the system responsible for such results has been slowly gaining strength; it is now clearly formulated,

and, as this legislation shows, can make itself felt. It is based on the belief that scientific management is only another device employed by capital to exploit labor.

"One form this exploitation takes, the opponents of it say, is in neglecting the element of fatigue. Anyone can speed up his work under the pressure of emergency, but a man cannot maintain that pace week in and week out; and when the work is monotonous—repeating thousands of times a cycle of uninteresting motions, careful provision must be made for easing, whenever possible, the nervous strain that it puts on the worker. The objection has some foundation in fact, but it springs not from the system itself, but from the abuse of it. True efficiency cannot be obtained at the cost of the worker's well being. Another way in which scientific management weakens the control that labor desires to effect through organization is that the premium paid to the skilful worker is fixed, not by the approved method of collective bargaining, but by the free decision of the employer. Through such breaches in the defense built up by the forces of organized labor they fear that they may lose all that they have won and held.

"Rightly understood and rightly applied, the methods of scientific management should benefit, not one party at the expense of the other, but the industry as a whole. In the end it will be found that both the side that misapplies those methods and the side that opposes them will suffer, for through its shortsightedness it will have sacrificed the permanent welfare of the whole for the temporary welfare of a part."



Legislation for Health Insurance.—Through the National Association for the Study and Prevention of Tuberculosis the nearly fifteen hundred antituberculosis associations in every part of the United States will be asked to participate in the campaign for Health Insurance undertaken by the American Association for Labor Legislation.

The Antituberculosis Associations are counting on Health Insurance as an aid in controlling the spread of tuberculosis as it should provide machinery to discover those cases which cannot now be found by the ordinary methods. The antituberculosis workers however expect the greatest help from that feature of Health Insurance

legislation which will promote physical examinations in all the industries.



Wright Wire Company Insures Employees.—The Wright Wire Company of Worcester and Palmer, Mass., have adopted a plan of insurance for their employees based on length of service. The benefits to be derived are as follows:

All employees one year or less in service to be insured in the sum of \$200; all employees more than one year and less than two years in service \$300; more than two years and less than three years \$400; three to four years \$500; four to five years \$600; five to six years \$700; six to seven years \$800; seven to eight years \$900; eight years or more \$1,000.

The amount of insurance payable to each employee will be automatically increased by each year of service until the maximum of \$1,000 has been reached. No employee is called on to assume any expense for this insurance which continues in force while the employee is in the service of the company.



Safety First in a Rubber Factory.—According to the safety expert of the Republic Rubber Company "Safety First" lies not only in guarding machinery but in educating the men themselves to shun danger and protect their fellow workmen. It is stated that this educational work has in the Republic Rubber Company reduced accidents 50 per cent. as compared to four years ago when the work was first begun.



Dust Removal in the Making of Mattresses.—It is stated that a machine has been designed to draw from cotton in the manufacture of mattresses such loose dust as may be contained in the bale of cotton. There is a receiving chute through which the cotton passes into the body of the machine. There the dust is drawn out. The sediment passes through a tube into a condenser.



Safety-First Week in a Steel Mill.—Postal cards have been sent out by the safety department of the Youngstown Sheet and Tube Company announcing the various events of a Safety-First Week to be held by that company. One of the features of the week will be prizes given to the foremen who can truthfully report that

no accidents have occurred in their departments during the entire period. If there are accidents in the departments a list of them will be posted on bulletin boards together with methods that might have been used to avert them.



Wage Waste Due to Illness.—At the third annual New England Conference on Tuberculosis held at New Haven on October 13 it was stated that the annual wage wastage due to illness in this country was about \$500,000,000. The necessity for legislation to reduce this waste was the subject of interesting discussion among the delegates to the conference.



Health First.—Health first as an outgrowth of health insurance legislation is one of the most important of the many arguments in support of compulsory health insurance contained in the brief recently issued by the American Association for Labor Legislation. All fields of preventive activity will receive fresh impetus. For example defective factory sanitation will be reformed under the stimulus of cash value given to health by this form of insurance.

To the German sickness insurance system the advance of this country in factory sanitation has been attributed. In Great Britain a medical research committee organized in connection with the national insurance act, has recommended thoroughgoing reforms for the boot and shoe trade, as the result of its inquiry into the incidence of tuberculosis in that industry.

In our own country the rapid progress of safety-first campaigns inaugurated against accident, justifies the conclusion that after a few years' experience under health insurance we shall not be less forward than European pioneers in this new field of preventive work. Preventive medicine will be aided by the increased opportunities possible when a man is not held back by a high fee from consulting a physician, but has ready access to the best medical advice as one of the benefits to which his insurance payments entitle him. Under these conditions which make for the yearly detection of disease the death-rates from cancer, tuberculosis and from the premature degenerative diseases, may be expected to diminish until the mortality rates from the middle age groups show a steady decline. Compulsory health insurance is at

once an economical method of providing for the needs of the wage earner and a strong force for the inauguration of a mighty campaign for health conservation.



"Disinfecting Imported Hides.—Effective January 1, new rules and regulations have been issued by the treasury department and the department of agriculture directed toward the exclusion of anthrax carried in imported hides; also against foot and mouth disease and rinderpest. Hides from countries not shown by the United States consular agents or official veterinary or sanitary inspectors of the countries to be free from anthrax, if such hides are to be admitted on certificate, must be certified to have been immersed in 1:1,000 solution of mercuric chlorid for twenty-four hours instead of thirty minutes, as under present regulations. Hides in bales unaccompanied by certificate of freedom from anthrax, rinderpest or foot and mouth disease, or by certificate of disinfection, will be admitted if such bales have been whitewashed under United States consular supervision and the importers agree to ship them in customs-sealed cars to a tannery provided with adequate facilities for disinfection, and to disinfect them in accordance with the requirements of the Bureau of Animal Industry under supervision of an agent of the bureau. Sun-dried hides from countries certified to be free from anthrax will be admitted without disinfection."—*Journal of the American Medical Association*, Nov. 18, 1916.



Health Insurance.—The following comment appeared in the *Medical Times* October, 1916. It is very apparent that a part of the medical fraternity is bitterly opposed to social legislation, such as compulsory health insurance.

"Compulsory health insurance will relieve nobody but the charity organizations. It is nothing but a miserable palliative for the evils of poverty. Wages may have gone up in the past few years, but the purchasing power of the dollar has fallen, and the working man is no better off than he was twenty years ago. This is evident to anyone who will examine Chapin's Standard of Living, or Scott Nearing's work on wages, or the statistics of the United States Bureau of Labor. A working man's family of normal size can have no surplus worth talking

about at the end of any year, if indeed it can make ends meet after living decently.

"Compulsory social insurance ought to be abhorrent to a democracy anyway. It is wholly foreign to the genius of American life. From any point of view excepting that of our professional philanthropists (?) it is a deplorable measure.

"If conditions in the world of labor were what they ought to be, such a hideous device as compulsory health insurance would be inconceivable. The passage of such legislation is indicative of the hopelessness of labor's plight.

"The profession should decline to be used in the putting over of such schemes, and the workers should refuse to accept candy sticks in place of economic justice.

"If our boasted altruism is anything but hypothetical, and if we have not reached an utterly cretinoid state, this kind of legislative 'frightfulness' will be throttled beyond hope of resurrection."

Metering Accidents Day-By-Day.—At the plant of the Inland Steel Company, according to the November *Factory*, the assistant safety inspector balances one month's accidents against another and appeals to the men to beat the previous month's record. To picture the comparison of month-by-month accidents, so that all the men can understand and enter into the spirit of the contest, "the accident meter" was installed on the bulletin board at each of the gates. The "meter" is divided into ninety degrees or points. Each time an accident takes place which results in the loss of one or more day's time the indicator goes up one point. By indicating each day's standing the meter may be compared with the previous month at the same date, and readily show whether accidents are on the increase or decrease. Prizes are offered for safety suggestions.

Dressmaking as a Trade for Women in Massachusetts.—This investigation, carried on by Dr. May Allinson, according to Bulletin No. 193, Bureau of United States Labor Statistics, proves that there are some phases in the dressmaking trade which are open to improvement, although on the whole the trade provides better working conditions and more opportunities for advancement than are found in most other large

women-employing industries. The social content of the employees is distinctly above the industrial level. The investigation assumes greater interest when one knows that the industry employed in the United States in 1910, 338,147 women, 16 years of age and over. Sixty-two per cent. of the girls who went out of the thirteen Massachusetts trade schools in 1914 had been trained for the dressmaking trade.

Coal-Mine Fatalities in the United States, 1915.—According to a recent report of the Bureau of Mines the coal mine fatalities in the United States for 1915 show a decrease as compared with the year 1914. The fatality rate for 1915 was 2.95 per 1,000 men employed. This is the lowest rate since 1898 when a rate of 2.71 was reported. The actual number killed in 1915 was the lowest since 1906. This saving of lives is ascribed to more careful inspection by the state inspector; better enforcement of laws and regulations by the operators; the miner's realization of the dangers connected with his daily work; the more general use of safety lamps; the use of permissible explosives; humidifying dusty mines; the enactment of industrial accident compensation laws; and the spirit of coöperation on the part of all concerned.

American Association of Public Employment Offices.—Bulletin 192 of the United States Department of Labor (May, 1916) covers the proceedings of the American Association of Public Employment Offices. The first meeting was held in Chicago in December, 1913, and two other meetings have been held since. The discussion at the three annual meetings have dealt with fundamental principles and practical problems of the greatest interest and usefulness. It must be conceded that unemployment is the greatest evil of our competitive industrial system. It is to be hoped that a national system of employment offices may be developed. Appended is a list of federal, state and municipal bureaus in the United States, and a discussion of public employment offices in Great Britain and Germany. Some very interesting tables show the nature and scope of unemployment insurance abroad.

The New York State Department of Labor published a special bulletin on the "European

Regulations for Prevention of Occupational Diseases." This interesting bulletin is issued as Bulletin No. 76 under the direction of the Industrial Commission and is valuable as a ready reference for the industrial sanitarian. The regulations refer to brass, bronze, copper, lead and tin, to organic and inorganic dusts, gases, vapors, fumes, anthrax infections, excessive humidity and compressed air.



The Third Annual Report of the Massachusetts State Board of Labor and Industries dated January 1916 details the work which has been done in the previous year and recommends certain legislation. The recommendations refer to industrial work in tenements, employment of minors, wages of mechanics employed on public works, weekly payment of wages, receptacles for expectoration and inspection force. There are 50,000 industrial establishments in Massachusetts and only 24 inspectors to do the work. An additional force of 12 inspectors is urgently needed. Of special interest to the industrial sanitarian is the report of the "Industrial Development Division." Appendix E analyzes all of the reported industrial diseases in tabular form. The report contains further the bills presented to the legislature by the State Board of Labor and Industries during 1915 and some Supreme Judicial Court Decisions.



Florence E. Perry outlines the scope of work of the Cleveland "Occupational Disease Bureau" in the October copy of *The Public Health Nurse Quarterly*. This new department grew out of the Tuberculosis Bureau of the Division of Health in Cleveland. At the present time the work of the new bureau consists of (1) Recording occupational histories received through the dispensaries, (2) Reporting to the state all cases of industrial tuberculosis, (3) Visiting the local factories and industries to learn the extent of industrial welfare work and to bring their attention to cases of occupational disease coming from their plant. The bureau coöperates actively with the State Division of Industrial Hygiene. The work meets with the hearty coöperation of the employers. Many employers speak enthusiastically of the value of medical inspection and nursing service, but feel that the other welfare activities are adopted for their advertising value. The greatest need in an industrial

community is a hospital and dispensary for the study of occupational diseases as is maintained in Milan (Italy), where it has proved of inestimable value.

The same publication contains an article on "Industrial Nursing" by Alice L. Eastman. She points out that this phase of welfare work is rapidly spreading. A dispensary centrally located in one of the factory buildings is essential as a nucleus. Health talks on prevention of illness and disease give splendid results. The nurse can make herself valuable in many ways. She can look after sanitary matters which do not require the attention of an expert specialist. She can look after the employees in their own houses, give pre-natal advice to expectant mothers, and instruct them how to take the best care of their children. The nature of the nurse's work will depend largely upon where she locates and what is manufactured. A weekly or monthly report should be sent to the management.



The Pennsylvania *Medical Journal* of October, 1916, gives a detailed account of the Conference of Physicians, which were held February 17 and May 18, 1916 in Harrisburg under the auspices of the Pennsylvania Department of Labor and Industry. Some of the papers read were: "Asphyxiation and Suffocation," "Lead Poisoning," "Relation of Extreme Temperatures to the Efficiency of the Workman" and "The Mortality from Diseases of the Lungs in American Industry." The credit for having brought the industrial physicians of the State together belongs to Dr. Francis D. Patterson, Chief of the Division of Hygiene and Engineering, Pennsylvania State Department of Labor and Industry.



The *Monthly Review* of the United States Bureau of Labor Statistics (November, 1916) is as usual a mine of information. A large number of domestic and foreign publications pertaining to industrial hygiene, health insurance and employment is abstracted. Anyone who has not the time to follow the ever increasing literature of the broad fields will find it to great advantage to have the *Monthly Review* on his desk regularly. The first article calls attention to Conference on Social Insurance, called by the International Association of Industrial Accident Boards and Commissions to be held in Washington, D. C., December 5 to 9, 1916. At

this conference will be considered the merits, demerits, defects and shortcomings in our workmen's compensation laws, needed amendments, sickness insurance, pensions, mother's pensions, and other matters relating to social insurance. It is the purpose of this conference to define the problems clearly for the information of legislators and administrators. The proceedings of the conference will be published by the United States Bureau of Labor Statistics as a bulletin of that bureau.

✱

The Special Bulletin No. 79 of the New York State Department of Labor, Division of Industrial Hygiene, is wholly devoted to a discussion of "Anthrax." The occurrence in 1914 of several cases of suspicious skin infections in tame eues in New York State led to the investigation of the prevalence of Anthrax. The causes of the outbreaks and the methods of control and eradication are gone into at considerable detail. The bulletin concludes with valuable recommendations for the physician, the employer and the workman.

✱

The Third Annual Report of the Department of Workshop and Factory Inspection of the State of Tennessee deals with the efforts and accomplishments of this department in the enforcement of industrial laws. Proper ventilation was one of the most important problems and the most difficult. A compilation of the expenditure per capita on the part of the State of Tennessee for its labor department shows that the state is far behind other progressive states. New York State for instance shows a per capita expenditure of \$0.758, Tennessee an expenditure of only \$0.051. The result of the inspection work, hours of labor and individual accidents are given in tabulated form.

✱

The September Bulletin of the Pennsylvania Department of Labor and Industry contains a compilation of all essential portions of the Pennsylvania Labor Laws.

✱

The Bulletin of the Industrial Commission of Ohio, Report No. 21, contains information for

the first eighteen months of the Ohio Workman's Compensation Act as a compulsory measure, January 1, 1914-June 30, 1915. It furnishes information concerning 100,003 industrial accidents and will be found to be of great assistance in the campaign for accident prevention. The total amount awarded was about four and a half million dollars. The total number of claims disallowed was 7,986. Eighteen claims involving permanent total disability were allowed. The report classifies accidents as to cause by the primary or principle cause. This is not necessarily the immediate cause. The whole matter is tabulated extensively.

✱

Bulletin 78 published by the New York State Industrial Commission contains the text of the labor laws and other laws relating to labor which were enacted in New York State in 1916. These laws pertain to fireproof construction of factories, labor on public works, employment of children in making motion picture films, illiterate employees on trains, child labor certificates, automatic sprinklers in factories, inspection of buildings in New York City, and workmen's compensation. Altogether thirteen laws were passed.

✱

According to November *Factory*, the Anaconda Copper Mining Company has established a rule that any man who fails to take the necessary precautions for safety should be laid off for a period of seven days. A 50 per cent. reduction of serious accidents in their plant is largely attributed to this step which the company considers is necessary for the protection of the men themselves.

✱

The August Bulletin of the Pennsylvania Department of Labor and Industry is as usual full of timely hints and matters pertaining to industrial hygiene and accident prevention. It deserves the earnest attention of the students of this particular field. How much there remains to be done can best be judged from the fact that during the first six months of 1916 the number of killed and injured in this state was 20,197. The number of killed was 189.

Personal Notes.

Mr. Nels A. Nelson of Fitchburg, Mass., formerly health officer of Long Branch, N. J., has been appointed health inspector of Red Bank, N. J. He is a graduate of the Worcester Polytechnic Institute, and goes to Red Bank with the endorsement of the New Jersey State Board of Health.

Surgeon W. H. Slaughter of the United States Public Health Service, formerly in charge of the Federal Health Survey, Floyd County, Georgia, has been transferred to the Marine Hospital, Stapleton, N. Y.

Dr. Frank G. Beard has resigned his position as health officer of the city of St. Joseph, Mo.

Dr. W. E. Cole of York Village, Maine, has been appointed epidemiologist of Akron, Ohio.

The Health Department of the District of Columbia announces the appointment of Dr. Joseph A. Murphy, formerly with the medical service of the United States Office of Indian Affairs, as chief medical and sanitary inspector of public schools; and the appointment of R. R. Ashworth, D. V. M., as chief food inspector.

The following persons were elected to membership in the American Public Health Association, December 1, 1916:

Perkins Boynton, Clarksburg, W. Va., Chemist and Bacteriologist for Water Filtration Plant.

Abraham Zingher, M. D., New York City, Assistant Director Research Laboratory, Department of Health, Bureau of Municipal Research, New York City.

Arthur A. Metcalf, M. D., Crystal Falls, Mich., City Health Officer.

Wm. Hassler, M. D., San Francisco, Cal., Health Officer.

Charles Weisman, Pittsburgh, Pa., Sanitary Chemist, United States Public Health Service.

I. S. Osborne, Cleveland, Ohio, Consulting Sanitary Engineer.

C. W. Girdlestone, M. D., Riverside, Cal., Health Officer.

John Thames, M. D., Winston-Salem, N. C., Health Officer.

Hector Palardy, M. D., Hull, Que., District Health Inspector.

Prof. G. O. Higley, Delaware, Ohio, Teacher of Chemistry.

George Elliott, A. I. S. E., Karachi Cantt, India, Sanitary Engineer.

Current Public Health Literature.

AMERICAN.

Albany Medical Annals.

XXXVII. November.

The Modern Medical School: Its Relations to the Hospital and the Medical Profession. George Blumer.

Albany Hospital. Fourteenth Report of Pavilion F, Department for Mental Diseases, Year ending September 30, 1916. J. M. Mosher.

American Journal of Diseases of Children, Chicago.

12. November.

The Neurotic Child. Some Familiar Symptoms and their Problems. C. Macfie Campbell.

Provocative and Prophylactic Vaccination in the Vaginitis of Infants. A. F. Hess.

The Effect of Cold Air on the Blood Pressure in Pneumonia in Children. J. L. Morse and D. M. Hassman.

Acetone Body Production in Infancy and Childhood. J. Howland and W. McK. Marriott.

American Journal of Nursing, Baltimore.

XVII. November.

Diet Kitchen Methods of Instruction. Alice U. Fewell.

Smallpox on an Indian Reservation. Mary E. M. Carter.

An Apparatus for Keeping Salt Solution Warm. A. L. Mackeen.

Diseases of the Throat and Teeth. Charles C. R. Borden.

Tracing the Sources and Limiting the Spread of Infantile Paralysis. Charlotte Talley.

Boston Medical and Surgical Journal.

CLXXV. November 9.

Syphilis of the Lungs. N. K. Wood.

Control of Scarlet Fever. D. M. Lewis.

Report of Committee on Workmen's Compensation.

November 16.

Mental Pitfalls in Adolescence. H. R. Stedman.

The Relation of the State Department of Health to the Communicable Diseases of Childhood. A. J. McLaughlin.

Measles and the Public Health. E. H. Place.

The Etiology of Scarlet Fever. F. B. Mallory.

Scarlet Fever. C. V. Chapin.

Report of the Fatal Cases of Diphtheria Occurring in the Connecticut Valley Health District of Massachusetts during 1914. J. S. Hitchcock.

Diphtheria. W. H. Park.

Whooping-cough: The Measures to be Taken for Its Control and Prevention. J. L. Morse.

November 23.

The Physically Defective. Edward O. Otis.

A Report of three Cases of Typhus Fever. M. G. Berlin.

November 30.

Psychic and Neuropsychic Affections in War. E. Régis.

Drug Addiction and Modern Methods for Its Control. S. H. Rubin.

Cleveland Medical Journal.

XV. October.

A Report of the Complement Fixation Test for Gonorrhea. T. P. Shupe.

The Progress in Pediatrics. Infantile "Grip." H. C. King.

Review of the Progress in Medicine. Paratyphoid Fever. H. Feil.

Journal of the American Medical Association, Chicago.

LXVII. November 4.

The Duty of the Medical Profession Toward the Council on Pharmacy and Chemistry. R. A. Hatcher.

A Study of Two Hundred and Twenty-six Cases of Chorea. I. A. Abt and A. Levinson.

The Recent Epidemic of Grip. J. A. Capps.

The Intestinal Parasites of Twenty Foreign Students in the University of Wisconsin. E. J. Van Liere.

November 11.

The Health Education of the General Public. W. C. Rucker.

The Nonspecific and the Specific Defense of the Child against Tubercle Bacillus. F. M. Pottenger.

The Use of Boiled Milk in Infant Feeding and Elsewhere. J. Brennemann.

The Use of Malt Soup Extract in Infant Feeding. B. R. Hoobler.

Bacteriologic Findings in Cerebrospinal Fluid in Poliomyelitis. A Preliminary Report of the Examination of Fifty Cases. J. W. Nuzum.

The Therapeutic Research Committee of the Council on Pharmacy and Chemistry of the A. M. A. Torald Sollmann.

November 18.

Useful Drugs. M. I. Wilbert.

Duodenal Cultures in Typhoid Fever as a Means of Determining Complete Convalescence. A. L. Garbat.

The Relation of Diet to Beriberi and the Present Status of Our Knowledge of the Vitamins. E. B. Vedder.

Local Reactions of the Pasteur Treatment and Their Time of Appearance. J. C. Genger.

Epidemics of Pemphigus Neonatorum in Chicago. F. H. Falls.

November 25.

Further Studies of the Protein Poison. V. C. Vaughan.

A Study of Diarrheas in Boston for 1915. J. I. Grover.

An Analysis of the Mortality for 1915 in the Infant Welfare Stations of Chicago. H. F. Helmholz.

Care of Troops on the Mexican Border. W. P. Chamberlain.

The Work of the American Medical Association Chemical Laboratory. W. A. Puckner.

Studies of the Prophylactic Immunization with Bacillus Typhi-Exanthematici. Harry Plotz, P. K. Olitsky, G. Baehr.

Journal of Infectious Diseases, Chicago.

19. November.

The Specificity of the Alderhalden Reaction with Vegetable Proteins. The Biologic Reactions of the Vegetable Proteins. O. J. Elssesser.

The Complement Content of Eck-fistula Dogs. N. P. Sherwood, C. Smith, R. West.

The Permeability of the Gastro-intestinal Wall to Infection with Sporothrix Schenckii. D. J. Davis.

The Relation of Allantoin Excretion to Leukopenia and Leukocytosis in Rabbits. O. H. P. Pepper, T. G. Miller.

A Laboratory Infection Caused by a Bovine Strain of Bacillus Enteritidis. K. F. Meyer.

Further Studies on the Virulent Salt Solution Used in the Production of Hog-Cholera Serum. W. S. Robbins.

A Case of Anthrax. G. G. Reinle, R. A. Archibald.

Comparison of the Rate of Multiplication of Bacteria in Raw Milk with the Rate in Pasteurized Milk. P. W. Allen.

Experimental Studies with Endamoeba Gros. F. Hecker.

Culture Media for Gonococcus. T. Watabiki.

Journal of Laboratory and Clinical Medicine, St. Louis.

II. October.

Uric Acid in Its Relation to Metabolism. S. R. Benedict.

Poisonous Proteins. V. C. Vaughan.

A Study of the Tests of Liver Function. C. S. Foster.

Some Technical Difficulties Involved in the Comparison of the Diazo and Urochromogen Tests. J. E. Pottenger.

Cases of Infection Terminating in Septicemia. P. G. Wolley.

Clinical Methods for Determining the Buffer Action of the Blood. J. J. R. Macleod.

The Purity of Alcohol. V. C. Vaughan.

Water Bath Slide Methods for Complement Fixation and Blood Grouping. N. E. Williams.

Medicine as a Career. Editorial.

Journal of the Outdoor Life, New York.

XIII. December.

How We Can Help the Tuberculous. A. K. Krause.

The Passing of the Tubercle Bacillus. H. M. Friedman.

Talks to Children in Red Cross Seals.

November.

The History of the Growth of the Antituberculosis Movement in Massachusetts, and the Lessons to Be Learned Therefrom. V. Y. Bowditch.

Woman's Duty in the Combat of Tuberculosis. S. A. Knopf.

Obligation of the Discharged Sanatorium Patient. J. S. Ford.

Journal of the National Dental Association, Huntington, Ind.

III. November.

Report of the Mouth-Infection Research Corps of the National Dental Association. T. B. Hartzell, A. T. Henrici, W. A. Grey.

The Specificity of Streptococci. A. T. Henrici.

Proceedings of the National Dental Association.

Sweeping Away the Confusion that Has Existed Regarding the Streptococci of the Mouth. Editorial.

Interstate Medical Journal, St. Louis.

XXIII. November.

Plea for the Tabetic. Morris Crossman.

Ziehen's Conception of the Psychopathology of the Disturbances of Perception. Max A. Bahr.

On Shame. James Rae.

What is Insanity. L. B. Pillsbury.

Race Progress vs. Race Degeneracy. C. L. Redfield.
A Sero-Enzyme Study of Bacterial Proteins. H. C. Ward.
Progress in Tuberculosis. John B. Hawes.

Medical Record, New York.

90. November 11.
Infant Malnutrition. W. H. Porter.
The Military Quarantine Stations of Hungary. B. F. Morowitz.

November 18.
The Crucial Age of Man. W. S. Gleason.
Mental Hygiene. H. M. Friedman.

November 25.
Latin and Ancient Greek for Modern Doctors. A. Jacobi.
The Management of the Recent Epidemic of Poliomyelitis in New York City from a Neurologist's Viewpoint. W. M. Leszynsky.
A Theory of the Causation of Poliomyelitis. D. W. Wynkoop.
Report of the Committee on Industrial Hygiene of the Retail Dry Goods Association. M. H. Kahn.
Observations of Tetanus with Observations of a Successfully Treated Case. L. Sexton.

Modern Hospital, St. Louis.

VII. November.
Brooklyn's Oldest Hospital Built Anew. W. J. Nealey, J. M. Hewlett.
The Convalescent Institution—Methods—Results. Frederick Brush.
The Hospital and the Surgeon. S. S. Goldwater.
New Army Train for the Mexican Border. A. G. Grinnell.
Canned Fruits—Their Quality, Purity, and Price. J. P. Street.
The Small Community Hospital. J. A. Hornsby.

New York Medical Journal

CIV. November 11.
Postures and Types of Breathing Exercises (21 illustrations). N. K. Mankell and E. C. Koenig.
The Relationship Between the Nervous System and Therapeutics in Pulmonary Tuberculosis. F. M. Pottenger.
Shall We Get Rid of Tuberculosis At Last? R. C. Newton.
One Thousand Wassermann Reactions. J. M. Ladd.
November 18.
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*THE JOURNAL OF THE AMERICAN
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Psychiatric Clinics in the Schools
John T. MacCurdy

The Relation of Alcohol and Syphilis to Mental Hygiene
Frankwood E. Williams

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C. Macfie Campbell

Malaria in the United States
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Official Monthly Publication of the American Public Health Association

DECEMBER 1916

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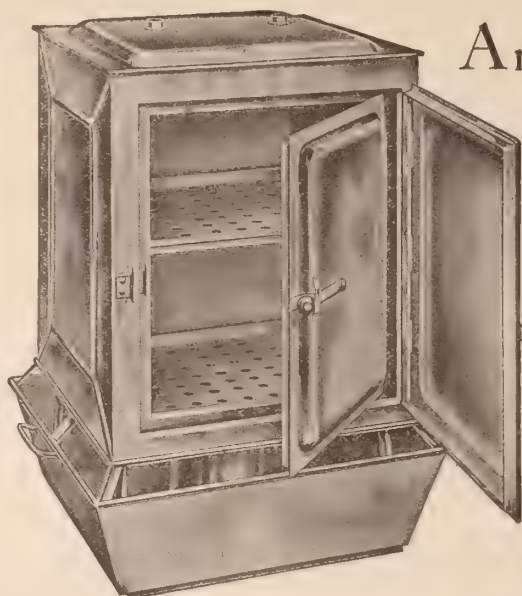
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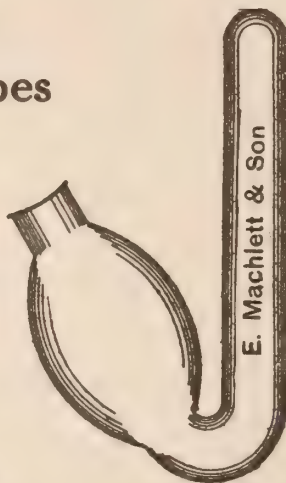
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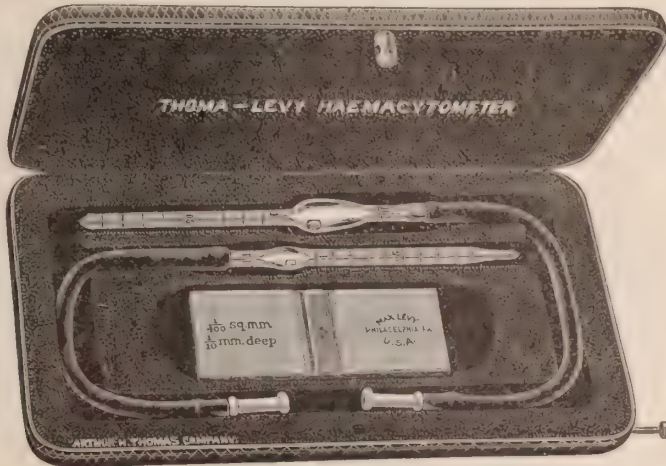
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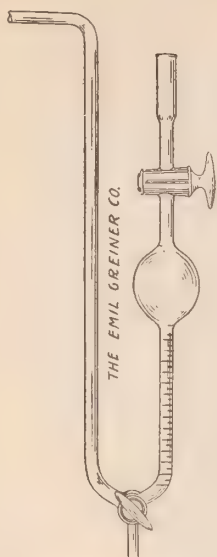
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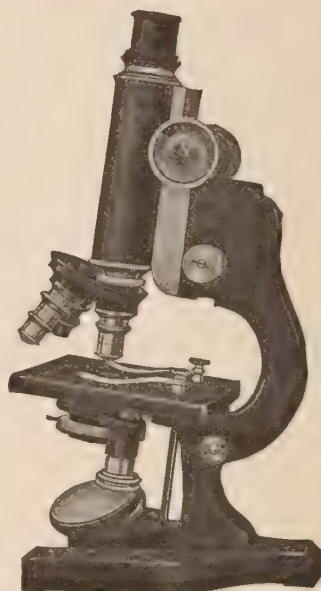
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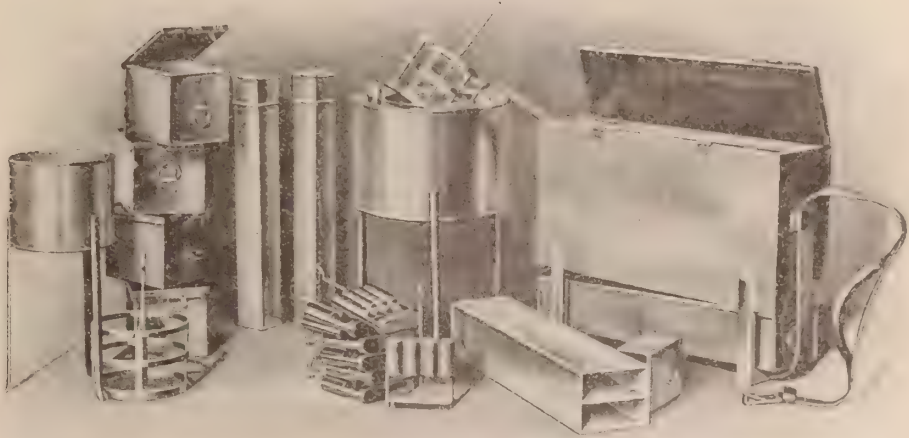
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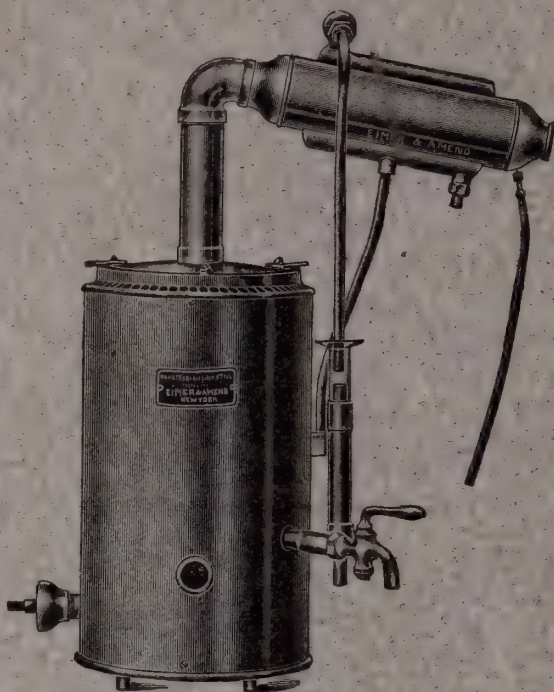
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